Essays on Financialisation, Income Distribution, and the Business Cycle

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By

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Abstract

The aim of this doctoral research project is to examine the impact of financialisation on income inequality and on business cycles. More precisely, the present study seeks to answer three core research questions: (i) Were the business cycles of the USA and the UK driven endogenously by the private debt aggregates since the late 19th century as suggested by Hyman Minsky's behavioural theory of economic fluctuations? (ii) Did the private debt aggregates and real share prices contribute to declines in labour share growth in France, Sweden, and the USA since the late 19th century? (iii) Which financial variables are linked to the rise of the top one per cent income share in the neoliberal era in the USA, Germany, and Sweden?

Chapter 1 provides strong econometric evidence for corporate debt-driven cycles *a la* Minsky in the US economy since it is found that the corporate debt ratio has been procyclical, and GDP and investment growth have been corporate debt-burdened in the full sample period. There is also weak evidence for Minskyan mortgage debt-driven cycles in the USA. Regarding the UK, there is evidence that its corporate leverage ratio has been procyclical. Chapter 2 shows that there is robust evidence that the mortgage debt accumulation has led to decreases in the labour shares of France, Sweden, and the USA since the late 19th century. For Sweden, real share prices and stock market capitalisation also exhibit negative effects on its labour share in historical context. However, the econometric findings suggest that the effects of power resources variables like union density and government spending are stronger than those of the financial variables. Chapter 3 estimates econometrically the determinants of the top one per cent income share in the neoliberal era. The results of the estimations suggest that real share prices increase the top percentiles of the USA and Sweden, dominating the other explanatory variables in terms of magnitude. In the neo-mercantilist, export-oriented economy of Germany it is the positive effect of trade globalisation that prevails over the rest explanatory variables, with finance playing a limited role. Unlike functional income inequality, the effects of financial variables prevail over those of power resources variables on the top one per cent.

The findings of this research project show that the financialisation of different sectors of the economy have different effects on the macroeconomy. Therefore, the concept of financialisation should be perceived as a dynamic, transforming process which has been historically integral to capitalism and should be studied in a comparative perspective by considering cross-country and cross-period discrepancies.

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Introduction

The great financial crisis of 2007-08 has been the biggest financial crisis since the great crash of 1929. Unlike the 1929 crisis, the 2007-08 collapse did not result in a great depression in most advanced economies. Exceptions are some southern European countries who did experience relatively long recession periods. However, even if the contractionary effects of the 2007-08 financial crisis have not been long-lasting, this historical event has raised the interest in the potentially destabilising role of finance. Thus, scholarship on the impact of finance on the economy and society has gained more prominence in social sciences during the last ten years (van der Zwan, 2014). This phenomenon has been characterised as the financialisation of the economy, which according to Epstein (2005, p. 3) refers to "*...the increasing role of financial motives, financial markets, financial actors and financial institutions*". The vast majority of the studies within this field come from the heterodox political economy tradition, i.e. Post-Keynesian economics (e.g. Stockhammer, 2004; Orhangazi, 2008; Palley, 2013; Hein, 2015), classical Marxist Political Economy (Lapavitsas, 2011; Fine, 2013), Monopoly Capitalism/Monthly Review school (Foster, 2007), and French Regulation School (Aglietta, 2000; Boyer, 2000). In addition, scholars within the disciplines of International Political Economy, Cultural Political Economy, and Sociology (e.g. Froud et al., 2002; Krippner, 2005; Aalbers, 2008; Montgomerie, 2006, 2009; Wood, 2018a, 2018b) also discuss aspects of the impact of the increased dominance of the finance sector over the real economy. More recently, quantitative macroeconomic historians have explored questions related to the effects of finance on the macroeconomy since the mid-19th century (Schularick and Taylor, 2012; Jordá et al., 2013, 2015, 2016; Aikman et al., 2013). The rising interest of scholars with diverse academic backgrounds in this field of scholarship pinpoints that this phenomenon is indeed of great importance.

To understand what the term financialisation means, first, we have to define it. Several broad definitions of financialisation have appeared through the years, but so far there is no canonical definition. This fact is not surprising in the sense that there is no unifying framework for the analysis of financialisation and its effects on the macroeconomic and microeconomic level. Different theoretical approaches have focused on different aspects of its impact, but so far, all aspects have not been integrated into a grand theory of financialisation. In general, we

can define financialisation as the phenomenon of the increased dominance of the financial sector over the real economy which triggers behavioural changes in the micro level that ultimately result in macroeconomic instability, greater imbalances, and rising income inequality. There are two broad areas of financialisation scholarship: (a) the impact of finance on growth; and (b) the effects of financialisation on the balance of power between different social classes which determines the distribution of income. The first area, i.e. the effects of finance on growth, has been historically dominated by Post-Keynesian scholars who build on the seminal works of Hyman Minsky (1975, 1986, 1992), with some more recent empirical contributions from macroeconomic historians. The second area has been more open as social scientists from different disciplines have examined how the dependence of different social groups on finance affects their bargaining position, thus income distribution. More broadly, Sawyer (2013) distinguishes two perceptions in the financialisation literature: financialisation as an integral part of the capitalist economy which has ups and downs throughout the decades, and financialisation as a distinct stage of capitalism. Most of the financialisation literature implicitly or explicitly falls under the second category (Lapavitsas, 2011; van der Zwan, 2014). Scholars within this approach even go as far as to use the term financialisation as synonymous to neoliberalism (Ioannou and Wójcik, 2019). Unlike those studies, the present doctoral research project examines the impact of financialisation on growth and income inequality by considering finance as historically integral to the capitalist system, i.e. rejects that neoliberalism and financialisation are synonymous terms. In this respect, it is essential to analyse how the financialisation of different sectors of the economy affect the behaviour of labour, capital, and rentiers and how this influence triggers changes at the macroeconomic level.

The first dimension of the dominance of finance over the economy is the financialisation of non-financial corporations in the form of rising business debt accumulation. The dependence of non-financial firms on private financial institutions has implications both in terms of macroeconomic instability and in terms of shifting the balance of power towards capital owners. Regarding macroeconomic instability, Hyman Minsky has been the first economist to provide an analytical framework for the analysis of corporate debt-driven endogenous business cycles. According to his approach, in periods of economic stability in which demand grows, firms tend to become more optimistic, thus they want to invest more. As their desired investment rate rises faster than retained profits, they decide to become riskier and increase their debt ratios in order to cover this funding gap. The additional sources of

investment funding do increase investment in the short-run leading to a boom period. However, the accumulation of corporate debt increases debt service commitments, hence firms save a gradually rising portion of their retained profits in order to repay their debt which eventually decreases their investment expenditure in the medium/long-run. In addition, eventually private banks realise that this debt-driven growth model is unsustainable, therefore their uncertainty rises which leads them to increase the price of borrowing deteriorating further the financial position of firms. The subsequent decrease in investment expenditure, due to the deteriorating financial position of firms and banks, and prospects for sustainable economic growth leads to a slowdown in accumulation which results in rising unemployment. The decrease in demand for labour increases the competition in the labour market, creating downward pressures on wages which eventually harms effective demand further. Beyond inducing endogenous crises, the accumulation of business debt by non-financial firms can also have an effect on the balance of power between capital and labour. As suggested by scholars within the Kaleckian tradition (Hein, 2007; Argitis and Dafermos, 2013) it is likely that, if firms are relatively more powerful relative to labour in the first place, firm managers will attempt to counterbalance the deterioration in firms' financial position due to debt accumulation by squeezing real wages. In this respect, given a pro-capital environment, firms have the power to incorporate their debt service commitments into their price mark-ups, i.e. shift functional income distribution towards capital. In the majority of advanced political economies, this decrease in the wage shares can indeed harm growth, given the results of empirical growth regime studies which show that demand is wage-led. That means that the magnitude of the decrease in consumption expenditure due to the falling wage share is larger than the magnitude of the relevant positive effect on investment (since wages are part of production cost), therefore a decrease in the wage share will induce a recession. Summarising, the harmful macroeconomic effects of corporate debt accumulation are dual as it can either directly decrease investment in the medium/long-run in the Minskyan sense or create contractionary effects due to the decrease in the wage share in wage-led economies as in Kalecki (1954).

The second dimension of the dominance of finance over the economy is the financialisation of non-financial corporations in terms of the impact of the growth of stock markets on corporate governance. The first contributions to analyse the impact of the influence of the stock market for the macroeconomy appeared during the 1980s with the papers of Beja and Goldman (1980) and Taylor and O'Connell (1985). According to the influential model of Beja and Goldman (1980), stock markets are constituted of fundamentalist and chartist

investors. The former tend to be more reluctant and invest with a long-term scope, while the latter act speculatively inducing higher share prices in the short-term. The coexistence of these stabilising and destabilising dynamics created by the two groups of investors can generate speculative asset prices cycles. But how that relates to the distribution of income? While normally the goal of firm managers is to efficiently choose long-term, secure investments that will yield profits, the growth of stock markets creates a new social group of influence: the shareholders. The income of shareholders is directly linked to the value of the company shares they hold; thus, it is of their interest to keep the share prices to the highest possible level in order to maximise dividend payments. In this regard, they exhibit pressure on firm managers to act accordingly. In the absence of enough private demand for shares, the straightforward way to retain high stock prices is to buy back shares of the company in order to internally increase the demand. To achieve that consistently substantial funding resources are needed. Hence, firm managers are likely to increase firms' corporate debt ratios in order to buy back shares and pursue the maximisation of shareholder value, i.e. dividend payments. According to Lazonick and O'Sullivan (2000), this process is characterised as the rise of short-termism in corporate governance. The core difference between the two forms of corporate financialisation is the initial incentive to increase corporate indebtedness: here it is the rise and the influence of shareholder class that induces firms to take on more debt, rather than firms' optimism and desire to invest more and more. As discussed earlier, if firms have power over labour, they will attempt to incorporate those debt service commitments into their price mark-ups, i.e. squeeze real wages in order to improve their financial position. As this wage share reduction decreases consumption, a recession is likely to occur, especially in an economy where demand is wage-led. Another possibility that arises in the scenario of the shareholder value oriented form of financialisation is that the growth of stock markets may benefit part of the working class, instead of squeezing its income. Upper-middle class workers may have access to buy shares, thus the increase in shareholder value can provide them with an additional non-wage source of income which depends positively on financialisation. Accordingly, rising share prices can indeed increase the bargaining power of the upper working class, given that a substantial part of shares is owned by them.

The third main dimension of financialisation is the financialisation of households in terms of household and mortgage debt accumulation by them. While Minsky's original thesis on private indebtedness's destabilising impact is focused on corporate debt, the issue of rapidly rising household indebtedness has become particularly popular after the 2007-08 housing-

driven crisis in the USA. A substantial part of the social sciences literature has focused on the connection among the accumulation of household debt, workers' loss of bargaining power, and higher inequality during neoliberalism. The argument that inequality may be exacerbated due to rising household indebtedness first appeared within the Foucauldian cultural political economy literature (Froud et al. 2002; Langley, 2007). According to cultural political economists, financialisation has transformed investor identities, inducing working class' self-discipline and loss aversion behaviour due to its dependence on finance. Rising debt commitments make workers more insecure about defaulting on their debt, therefore they avoid endangering their employment by negotiating more aggressively for higher wages. Of course, this linkage depends on country-specific institutional complementarities. According to Schwartz and Seabrooke (2008) in statist-developmentalist economies, like Sweden, the disciplinary effects of mortgage debt accumulation are likely to be modest as indebted homeowners are more protected by the state since housing is perceived a social right. By the same token, Argitis and Dafermos (2013) also discuss the potential negative wage impact of household debt accumulation arguing that its disciplinary effect depends on labour power resources. In an economy with wide bargaining coverage workers are protected, thus they are able to act more aggressively against employers and demand higher wages to improve their worsening financial position. In economies with weaker labour power resources, the disciplinary effect of household indebtedness will be stronger, inducing income inequality. Wood (2017) also makes a similar claim from a Foucauldian perspective arguing that the disciplinary wage share effects of household debt are expected to be weaker in statist-developmentalist economies like the Scandinavian countries and provides relevant empirical evidence for Sweden and Norway. Examining the potential role of households for economic fluctuations, Kim et al. (2017) present a formal post-Keynesian endogenous business cycle model in which workers become more optimistic during the boom period, thus they decide to increase their debt ratios either for consumption reasons or as residential investment in housing. Subsequently, the rising household debt commitments increase workers' cost of job loss, hence rising household indebtedness can lead to increases in functional income inequality. In a wage-led economy where higher functional income inequality has an overall negative effect on total private demand, this process will trigger a slowdown in accumulation, therefore it will lead to a recession.

All things considered, the analysis above outlines three main types/forms of financialisation: Corporatist debt-driven financialisation; Shareholder value oriented

financialisation; and household debt-driven financialisation. This categorisation pinpoints that the widely used term 'financialisation' is too broad and simplistic to describe the dominance of the financial sector over the real economy, which can take different forms across space and time. Most studies within the current financialisation literature describe financialisation as a combination of shareholder value orientation and rising mortgage indebtedness, which are indeed the two main elements of the neoliberal financialisation period. However, is that a historical stylised fact for the finance-dominated eras and does that hold unanimously in all different varieties of capitalism? The main argument of this doctoral thesis is that finance is integral to the capitalist system and can take different forms across space and time. Although one dimension of financialisation may prevail over others in a certain period or country, that does not necessarily mean that the macroeconomic impact of the rest will be negligible. This doctoral thesis scrutinises the macroeconomic impact of different channels of financialisation in historical context using time series analysis in order to account explicitly for cross-country discrepancies. Its focus is centred on the nexus between financialisation and two of the fundamental problems of political economy: economic fluctuations and the distribution of income. Therefore, this doctoral research project contributes to the empirical literature on the impact of financialisation on the macroeconomy, seeking to answer three core research questions:

(i) Were the business cycles of the liberal market economies of the USA and the UK driven endogenously by corporate or mortgage debt since the mid-19th century?

(ii) Has financialisation been inducing higher functional income inequality in France, Sweden, and the USA since the mid-19th century?

(iii) Has financialisation been contributing to the rise of the top one per cent income share in the USA, Germany, and Sweden during the post-Fordist, neoliberal accumulation regime?

To answer these empirical questions, I rely mainly on econometric estimations and descriptive statistical analysis. As financialisation can take different forms in different countries and under different epochs, I follow a time series-based econometric analysis, rather than panel data methodologies, in order to examine each case study separately and highlight any discrepancies and their qualitative implications. The choice of case studies for each chapter is based on data

availability (especially for the first two chapters) and on providing a comparison of different varieties of capitalism with diverse characteristics regarding domestic institutional structures. Considering finance as historically integral to advanced political economies at least since the 19th century, the present study uses annual historical macroeconomic data to scrutinise the first two research questions. Regarding the third main research question, the focus is shifted to the neoliberal era for two reasons: First, the population that constitutes the top percentile has changed dramatically in that particular period, including both top managers and rentiers, rather than exclusively rentiers (Piketty, 2014). Second, an existing empirical panel data study has examined the impact of finance on the top one per cent using historical macroeconomic data (Roine et al., 2009). Therefore, this doctoral research thesis is constituted of three main chapters.

In the first chapter titled '*Minsky Debt-driven Cycles in Historical Perspective: The cases of USA (1890-2015) and UK (1882-2010)*', I test econometrically the behavioural debt-driven business cycle theory of Minsky in historical perspective for the liberal market economies of the USA and the UK. Existing Minskyan empirical literature on the impact of private debt on economic fluctuations either focus exclusively on the negative effect of private indebtedness on GDP and investment or examine cycles in terms of oscillations due to standard deviation shocks of private debt (Palley, 1994; Kim, 2013, 2016). Regarding the quantitative macroeconomic history on financial cycles, their approach is mostly exploratory as the common practice is to test econometrically the effects of financial variables on the probability of financial crises (e.g. Schularick and Taylor, 2012; Jordá et al., 2013, 2015, 2016; Aikman et al., 2013). There are two fundamental problems with these approaches. First, the former studies examine only one aspect of Minsky's theory: debt-burdened growth. Second, either the standard deviation shock analysis or the estimation of probabilistic econometric models are methodologically closer to exogenous business cycle models, where an external shock destabilises the system. In this chapter, I test a minimalistic two-equation endogenous Minsky debt cycle model where the leverage ratio is procyclical, and GDP and investment growth are debt-burdened, i.e. I focus explicitly on both aspects of Minsky's endogenous theory. Since the equations are quite minimalistic, corresponding exactly to a simple 2D difference equations system of private debt and growth, estimating the model through ordinary least squares would result in serially correlated errors. To avoid such statistical issues, a straightforward statistical solution is applied: allow the error terms to follow moving average error processes of order one (MA(1)), i.e. use the Autoregressive MA(1) model (ARMA(1, 1)). Such a solution has

been proposed as one of the most effective ways to overcome serial correlation in minimalistic econometric specifications (Koreisha and Pukkila, 1990; Koreisha and Fang, 2001; Dufour and Pelletier, 2011). The econometric model is estimated for the full sample period, the pre-WWII era, and the post-WWII period. Regarding the private debt variables, I test both for the effects of corporate debt and the role of mortgage indebtedness. The full sample results provide strong evidence that the business cycle of the USA has been corporate debt-driven since the late 19th century. Either on an equation-by-equation basis or in the context of a system (Vector Autoregressive MA(1) model) the econometric findings show that the corporate leverage ratio has been procyclical, while simultaneously GDP growth and investment growth have been business debt-burdened. Therefore, it is confirmed that the US business cycle has been endogenously driven by corporate debt as in Minsky in historical perspective. For the USA, I also find weak evidence for a Minskyan mortgage debt-driven cycle, below the standard levels of statistical significance. Regarding the UK, there is econometric evidence that its corporate leverage ratio is procyclical over the full period, but the effects of business debt on growth are insignificant, hence only one aspect of Minsky's theory is confirmed. Similar weak evidence for corporate debt-driven cycles is also obtained for the post-WWII period. According to the estimations, the mortgage debt-growth system does not exhibit cycles for the UK. That may seem in contrast with the findings of the quantitative macroeconomic history literature which suggest that mortgage debt increases the probability of financial crises, but this is not necessarily the case. Mortgage debt accumulation may lead to deeper crises and recessions, but the results of this chapter show that it is actually corporate debt that drives endogenously the business cycle since the late 19th century, at least in the liberal economy of the USA.

In the second chapter titled '*The Comparative Political Economy of Financialisation and the Labour Share in the long-run: Evidence from France, Sweden, and the USA*', I explore econometrically whether mortgage indebtedness, corporate indebtedness, real share prices, and stock market capitalisation have been decreasing the labour shares of France (1911-2010), Sweden (1891-2000), and the USA (1929-2015). The estimations utilise the unrestricted error-correction model which is a commonly used model in the social sciences distribution literature that corrects for serial correlation (e.g. Kristal, 2010; Volscho and Kelly, 2012; Bengtsson, 2014a; Godechot, 2016). I also control for the effects of trade openness, union density, and government spending. As discussed earlier, different forms of financialisation can indeed benefit capital at the expense of labour under certain conditions. A constantly growing body of empirical literature on the determinants of functional income inequality provides evidence

that financialisation has been contributing to the decline of the labour shares in the neoliberal era (Lin and Tomaskovic-Devey, 2013; Alvarez, 2015; Stockhammer, 2017; Wood, 2017; Guschanski and Onaran, 2018; Köhler et al., 2018). The vast majority of those studies show that either financial globalisation or shareholder value orientation have been the main drivers of the labour share, while only Wood (2017) and Guschanski and Onaran (2018) find some evidence for negative effects of household debt on the labour shares of certain liberal market economies. Given that this project perceives financialisation as integral to capitalism, this chapter seeks to answer which dimensions of financialisation have been linked to the distributional conflict between capital and labour since the late 19th and early 20th centuries. As the effects of financialisation may also depend on other dimensions of the economy such as the state of the labour market (Argitis and Dafermos, 2013) or domestic governments' policy stance on housing finance (Schwarz and Seabrooke, 2008), I choose three case studies with diverse characteristics: France as a sector coordinated Dirigiste economy with weak labour power resources; Sweden as statist-developmentalist, nation coordinated economy with strong labour power resources; and the USA as the archetypal liberal, asset-based market economy. For France, the econometric findings show that the mortgage debt ratio has contributed to reductions in its labour share since the early 20th century. Also, it is found that government spending exhibits a positive effect on labour's income share in historical context. This result is consistent with the argument of Dutton (2002) that a universal social security system has been established in France since the pre-WWII period under the pressure of social groups like the feminists. For Sweden, the estimations show that mortgage debt, real share prices, and stock market capitalisation have been decreasing its labour share over the period 1891-2000. In addition, there is robust evidence that indeed strong labour power resources benefited labour in Sweden during the last century, as the positive effect of union density is statistically significant in the vast majority of specifications. For the USA, the results on the effects of financialisation are mixed, since mortgage debt exhibits a negative sign on its labour share, but business debt increases it since 1929. Regarding the rest explanatory variables, the positive effect of government spending is robust, showing that historically government intervention has benefited labour in the USA. As a final step into the analysis of this chapter, I calculate the standardised coefficients for the baseline specification for the three countries. This allows us to evaluate whether power resources or financialisation variables prevail in terms of the distributional conflict between capital and labour. Moreover, making the coefficients comparable in the case of the USA allows to clarify the overall impact of financialisation, i.e. compare the negative effect of mortgage debt with the positive impact of corporate debt. The

main findings of standardising the long-run coefficients suggest that the magnitude of traditional power resources variables, like government spending in France and the USA, and union density in Sweden, are stronger than the impact of financial indicators. Finally, in the USA the negative effect of mortgage debt prevails over the positive effect of business debt, hence the overall impact of financialisation is indeed negative. Overall, the main novelty of this chapter is that it is the first econometric study on the impact of financialisation on functional income inequality that uses historical macroeconomic data. The findings provide support to the view that finance has been integral to capitalism at least since the late 19th century (see Jordá et al. 2017) by reporting econometric evidence that financial variables have been crucial not only for the business cycle (see Chapter 1; Jordá et al. 2013, 2015, 2016) but also for the distributional conflict between capital and labour.

In the third chapter titled '*Financialisation and the Top 1% in the Neoliberal era: A Comparative Political Economy perspective*' I shift my focus from the historical dimension of financialisation and explore a research question related to the neoliberal era: Did financialisation contribute to the rise of the top percentile income share during neoliberalism? While functional income distribution refers to the distributional conflict between the factors of production, i.e. two well-established social groups historically, this is not the case for the top one per cent. According to Piketty (2014, pp. 276-278), at the beginning of the 20th century in advanced political economies, the top one per cent represented the rentier class, i.e. it was constituted primarily by income from capital. During neoliberalism, a substantial qualitative structural change has occurred as labour income prevails over capital income in the top one per cent. In this respect, the top percentile has become the income share of capital owners and the top managerial class, i.e. the working super-rich. This major structural change suggests that the analysis of the determinants of the top percentile requires a time-specific study, i.e. focus on its evolution under certain regimes of accumulation where its demographics have not changed substantially. Accordingly, this chapter centres on the post-Fordist, neoliberal accumulation regime. So far, studies on the impact of financialisation on the top one per cent have used widely panel data analysis or focused exclusively on the USA. The present study contributes to the literature by examining the effects of financialisation on the top percentile income share of three different varieties of capitalism through a comparative political economy analysis: the liberal economy of the USA (1974-2011); the export-oriented, sector coordinated economy of Germany (1972-2010); and the Nordic nation coordinated market of Sweden (1981-2012). As in the second chapter, I test for the effects of household debt, business debt,

real share prices, and stock market capitalisation using the unrestricted error-correction model. I also control for the effects of union density, government spending, trade globalisation, and corporate taxation. In the USA, the econometric findings show that real share prices have a robust positive impact on its top one per cent, while unionisation exhibits a negative sign, with the magnitude of the former being larger. In Germany, the positive impact of trade globalisation prevails over the rest statistically significant effects, which is consistent with its classification as export-oriented (Stockhammer et al. 2016). Regarding the rest robust long-run coefficients union density and government spending exhibit the expected negative effects, whilst real share prices have a negative impact on the top percentile which, as discussed earlier, may have to do with workers owning company part of the shares. In Sweden, household debt, business debt, and real share prices are the only robust long-run effects. Business debt and real share prices are found to induce an increase in the top percentile. Household debt decreases the top one per cent, which is consistent with the argument of Argitis and Dafermos (2013) that in countries with strong labour power resources indebted workers have the power to demand higher wages to improve their financial position, thus inequality decreases. In total, the econometric results of this chapter show that the drivers of the rise of the top one per cent vary significantly in different varieties of capitalism. In the USA, this phenomenon has been driven mainly by asset price inflation, i.e. shareholder value orientation. In Sweden, all financialisation variables play a key role but corporate financialisation seems to be more influential, as the positive effects of business indebtedness and real share prices prevail. In Germany, there is no evidence that the rise of its top percentile in the neoliberal era has been a financialisation-driven phenomenon, as the statistically significant long-run effects are that of trade openness, unionisation, and government expenditures. Last but not least, it is worth pointing out that unlike functional income distribution, the magnitudes of the financialisation variables are found to be larger than those of labour power resources variables for the top one per cent.

The main results reported in this doctoral thesis are non-trivial as they enhance our understanding of the role of financialisation for macroeconomic stability and income inequality. Recapitulating, macroeconomic instability in terms of investment slowdowns is found to be driven endogenously by corporate rather than household debt. However, household debt seems to play a key role for functional income inequality, having strong negative effects which suggest that the engagement of household in finance decreases their bargaining power, as cultural political economists have argued. Unlike functional income distribution, top income

shares are driven mainly by share prices rather than private debt aggregates. This implies that the rise of personal income inequality requires a different analytical framework which should emphasise which social group is represented by each inequality indicator. As personal income inequality indicators can represent different social groups under different epochs -e.g. see Piketty (2014) for the top one per cent income share- it is fundamental to take into account such structural changes. Finally, it is worth noting that power resources variables, like union density and government spending, are found to exhibit stronger effects than the financialisation variables on the labour share. The opposite holds for the top percentile which underlines that -at least in the neoliberal era- its rise is a phenomenon driven by the contemporary variant of financialisation.

Chapter 1

Minsky Debt-driven Cycles in Historical Perspective: The cases of USA (1890-2015) and UK (1882-2010)

1. Introduction

The interest in financial cycles research has grown significantly since the 2007-8 crisis, which has pinpointed the destabilising role of the liberalised financial sector. Recent neoclassical-oriented theoretical studies (see Eggertsson and Krugman, 2012; Farmer, 2013; Bhattacharya *et al.* 2015) have attempted to explain financial instability by enriching the existing New Keynesian-style macro models with several insights from the pioneering works of Hyman Minsky (1975, 1986, 1992). In addition, there is also a currently growing stream of the literature that explores empirically the issues of financial cycles and finance-driven business cycles, either by descriptive analysis (see e.g. Drehmann *et al.* 2012; Borio, 2014) or by econometric estimations (see e.g. Agnello and Schuknecht, 2011; Claessens *et al.* 2011, 2012; Schularick and Taylor, 2012; Jordá *et al.* 2013, 2015, 2016; Aikman *et al.* 2015; Bezemer *et al.* 2015; Mian *et al.* 2016). Most of these empirical studies evaluate financial and business cycles' synchronisation through Logit and/or Probit models, but only a few of them utilise recently developed historical macroeconomic datasets (e.g. Schularick and Taylor, 2012; Jordá *et al.* 2013, 2015, 2016; Aikman *et al.* 2013).

While Minsky's financial instability hypothesis is relatively new for the neoclassical economic thought, his ideas have been a pillar for a wide variety of Post-Keynesian (PK) endogenous business cycle theoretical models, emphasizing the interactions between the financial sector and the real economy, and underlining the inherently destabilizing role of the financial sector (see e.g. Foley, 1987; Jarsulic, 1989; Skott, 1994; Asada, 2001; Lima and Meirelles, 2007; Charles, 2008; Fazzari *et al.* 2008; Nishi, 2012). Despite the theoretical PK Minsky cycles' literature keeps expanding, the empirical work is very limited and, until now, has centred mainly on consumer and household debt. The three relevant studies by Palley (1994) and Kim (2013, 2016) attempt to evaluate endogenous debt-riven cycles mainly through impulse response functions analysis of multivariate Vector Autoregressive models with various

lag structures, and/or long-run cointegration analysis. The authors argue that the endogeneity of debt-driven oscillations is rooted in the positive short-run feedback from debt to growth, which, eventually, becomes negative in the long-run. Such an approach is simple and interesting, but it does not fully reflect the endogenous nature of Minsky's business cycle theory. The PK Minsky models involve oscillations generated by the continuous endogenous contradiction between negative interest payments' growth effects and investors' risky borrowing decisions during the boom, which, if one follows this approach, remains obscure. On top of that, strictly speaking, Minsky's original works are mainly concerned with the destabilising effects of business debt accumulation, and not household debt. Regarding the time dimension of these estimations, these studies focus only on the last three to four decades at best.

The aim of the present chapter is to contribute to the growing empirical literature on financial and finance-driven business cycles, by evaluating econometrically the endogeneity of debt-driven cycles, using historical macroeconomic data. First, responding to Schularick's and Taylor's (2012) call for new identification strategies, a new specification based on simple 2-dimensional endogenous business cycle models of difference equations is used. The necessary conditions for endogenous, interaction-driven oscillations in such dynamic systems is that the product of the off-diagonal elements must be negative. In terms of Minsky's original works that means that the leverage ratio must be procyclical and growth must be debt-burdened, which I evaluate by estimating a pair of a growth equation and a debt ratio equation, simultaneously. Second, I assess econometrically Minsky's business cycle theory by utilizing a historical time series macroeconomic dataset of annual observations, that extends approximately from the mid-19th century to date (see Appendix 1), focusing on the UK and the US. It is the first time that any empirical PK Minsky business cycles' study covers such a long historical period and examines case studies other than the US. Even within the historical macroeconomic data empirical literature, econometric estimations based on time series analysis are absent.

Given our minimalistic econometric specification, misspecification issues arise. To address those, I estimate our equations incorporating either moving-average error terms of order one (MA(1)), in order to avoid serial correlation issues. To assess potential regime shifts, I estimate our equations for three different periods: the full-sample period; the pre-WWII era (only for the UK where the length of the series allows it); and the post-WWII period. The main finding of our study is that the US economy has experienced corporate debt-driven Minsky business cycles over the full period. The full-sample estimations robust evidence for a business

debt-driven business cycle, according to the main results and the robustness checks. Also, there is weak evidence for a mortgage debt-driven business cycle over the same period, but below the usual standards of statistical significance. In the post-WWII period, there is no evidence for mortgage cycles, which may seem in contrast with the results of Jordá et al. (2016). Regarding the UK economy, its corporate and mortgage leverage ratios are procyclical in all periods, but the necessary conditions are not met since there is little evidence for the negative effects of private debt on growth.

The rest of this chapter is structured as follows. Section 2 outlines the distinguishing characteristics of the main PK Minsky models, building closely on the approach of Nikolaidi and Stockhammer (2017), in order to derive the two fundamental assumptions that govern a Minsky debt cycle: debt-burdened growth and procyclical leverage ratios. Section 3 reviews the existing empirical literature on financial and debt-driven business cycles, highlighting their methodological differences and their shortcomings. Section 4 presents our historical data sources and our econometric modelling approach, underlining its theoretical relevance. Section 5 discusses thoroughly and interprets the results of our estimations, contrasting them with comparable findings of the existing studies. Finally, the concluding section recapitulates our contribution and the main findings.

2. Endogenous Business Cycles and Financial Instability

During his long academic career, Minsky published numerous academic papers and several books, whose theoretical origins can be traced in the Post-Keynesian thought, but also in the old Institutionalist tradition. Despite his most influential publications on financial instability (see Minsky 1975, 1986, 1991) offer insightful perspectives on finance-dominated capitalism's dynamics, none of his writings provides us with a distinct benchmark theoretical model that summarizes his views. As a matter of fact, Minsky's successors have been attempting to incorporate elements of his analysis into the existing formal Post-Keynesian models, such as the Kaleckian or the Kaldorian. This fact has brought confusion, since the post-Minsky business cycles models use various different initial assumptions regarding the operation of the goods market, the financial variables of interest, and, thus, on the inherent (in)stability of the financial sector. The first attempt to classify the Minsky cycles models has been recently made by Nikolaidi and Stockhammer (2017) who develop simple two-dimension differential equations' systems which represent the various assumptions about the interactions between financial and real variables, in each case. According to this survey, there are two elements that

characterize the discrepancies between the existing Minsky cycles models: (i) The residual source of firms' finance which is either business debt or equities; and (ii) The state of the goods market, which is either Kaleckian, i.e. stable, or Kaldorian, i.e. unstable. Hence, we may distinguish three main families of Minsky models: the debt (and interest rate) cycles models, in which the only residual financing source is debt, and the speculative models, in which the investment gap is also covered by equities. It is also worth mentioning that the existing Minsky models are based on a simplified closed economy framework. This implies that pure financial effects may be less evident in small open economies, which are more susceptible to international shocks. The rest of this section summarizes the differences between the main families of these models in order to derive the testable hypotheses that I estimate subsequently.

2.1 Minsky Debt Cycles

Minsky's (1975, 1986, 1991) analysis is rooted in the PK and Old Institutionalist traditions. His writings offer rich insights on financial dynamics, but no canonical business cycle model. Minsky's successors have thus incorporated different elements of his analysis into formal business cycle models.

The distinguishing characteristic of the Minsky corporate debt-driven cycles models is that the hypothesized residual source of finance is business debt (Skott 1994; Asada 2001; Lima and Meirelles 2007; Charles 2008; Fazzari et al. 2008). The theoretical rationale behind these assumptions is that during the euphoria of the boom, the desired investment rate rises rapidly, exceeding retained profits' growth rate. This implies that this gap between desired investment and actual internal funding resources will be covered by corporate debt, hence the debt-to-capital ratio will rise accordingly. As the debt ratio keeps increasing, the relevant interest payments rise as well and a rising share of retained profits must be devoted to debt service. This makes the position of the firm gradually more and more fragile, which eventually leads to a crisis and debt deflation. A typical Minsky corporate debt-driven cycle model can be expressed in the following Jacobian matrix representation:

$$\begin{bmatrix} g_t \\ d_t \end{bmatrix} = \begin{bmatrix} \pm & - \\ + & \pm \end{bmatrix} \begin{bmatrix} g_{t-1} \\ d_{t-1} \end{bmatrix} \quad (1)$$

where g is the *growth rate*, and d is the business *debt-to-capital ratio*. The necessary conditions for oscillations in a Minsky debt cycle model is that growth must be debt-burdened ($J_{12} < 0$) and the leverage ratio pro-cyclical ($J_{21} > 0$). An important simplifying assumption of the Minsky debt cycles models is that they omit equity markets.

While Minsky's original emphasis on business debt-driven cycles, several authors attempt to formalise consumer debt and real estate prices in the context of Minskyan debt-driven cycle models. Palley (1994) presents a Minsky model that includes procyclical consumer debt accumulation. Modifying a multiplier-accelerator cycle model, Palley shows that, initially, debt flows increase aggregate demand through consumption, thus output, but eventually rising debt accumulation decreases aggregate demand. Ryoo (2016) develops a real estate price Minsky model, in which momentum trader expect further price increases when house prices grow. Ultimately, households' demand for houses will slowdown, curbing house prices, thus the housing cycle. Here, the key variable is the expected capital gains which are non-observable. Based on Palley (1994) and Ryoo (2016), I propose a Minsky mortgage debt-driven models similar to a 2D corporate debt-driven model, where the leverage ratio is procyclical, i.e. households' confidence during the boom period makes them increase their debt ratio in order to purchase a house. Eventually, increasing debt payments decrease growth hence endogenous fluctuations are generated. Such a Minsky household debt model can be depicted in the following Jacobian matrix form:

$$\begin{bmatrix} g_t \\ m_t \end{bmatrix} = \begin{bmatrix} \pm & - \\ + & \pm \end{bmatrix} \begin{bmatrix} g_{t-1} \\ m_{t-1} \end{bmatrix} \quad (2)$$

where *g* is the growth rate, and *m* is the mortgage or household debt-to-capital ratio. As in the Minsky corporate debt-driven model, the impact of mortgage debt ratio on growth must be negative ($J_{12} < 0$), whereas, since debt accumulation is driven by households' optimism, the effect of growth on the mortgage debt ratio must be positive ($J_{21} > 0$).

Models of finance-driven business cycles also appear in the New Keynesian tradition, in the form of financial accelerator models (Kiyotaki and Moore, 1997; Bernanke et al., 1999). In those models, asset price inflation induces borrowing, while the rise in leverage ratios reduces aggregate demand, as in Minsky, which leads to asset price deflation and thus, to instability. Despite those models do not strictly correspond to Minsky's PK framework, they do produce comparable results.

2.2 Interest Rate Cycles

Another sub-family of financially-driven business cycle models are the interest rate cycles models, which within the PK Minskyan tradition are represented by Foley's (1987) and Jarsulic's (1989) models. Compared to the demand-determined debt ratio of the Minsky debt cycles models, these models centre explicitly on endogenous credit supply as well, focusing on

commercial banks' interest rate determination. Therefore, endogenous credit supply by the commercial banks depends on (a) the supply of reserves by the central bank; (b) the desired interest rate; (c) the risk involved in making loans; and (d) the legal/institutional constraints regarding the use of reserves. Their supply-side rationale suggests that when the interest rate level is low enough, borrowing becomes cheaper, henceforth investment starts rising. As the increasing demand for loanable funds rises, it presses the interest rate level upwards, which eventually discourages new investment, and so on. What distinguishes these models from the debt cycles models is that a crisis may also occur because of a supply decision by the central bank or due to legislation change about the use of reserves[1], and not necessarily by business debt accumulation itself alone. Jarsulic (1989) provides an intuitive 2D Jacobian matrix representation of such a model, as follows:

$$\begin{bmatrix} g_t \\ r_t \end{bmatrix} = \begin{bmatrix} \pm & - \\ + & \pm \end{bmatrix} \begin{bmatrix} g_{t-1} \\ r_{t-1} \end{bmatrix} \quad (3)$$

where g is the *growth rate of capital stock*, and r is the *real short-term interest rate*. Growth is burdened by rising interest payments, and since the higher r becomes, the higher the interest payments become, i.e. J_{12} must be negative. Furthermore, as described right above the interest rate level is procyclical, thus J_{21} must be positive. Since the product of the off-diagonal elements of this Jacobian matrix is indeed negative, we do get the minimum necessary conditions for an interaction cycle between output and the interest rate. Obviously, a similar trivial investment-interest rate relationship could exist in a New Keynesian IS-LM framework (see Mankiw 2016, Ch. 17). This implies that even if one finds empirical evidence for interest rate-driven cycles[2], it is not possible to argue convincingly that the underlying mechanism is Minskyan and not New Keynesian and vice versa.

2.3 Other Minsky Cycles Models

The tradition of Minsky-inspired business cycles models also includes Keen's (1995) Goodwin-inspired model, in which oscillations occur due to the effect of debt on functional income distribution, leading to growth cycles in a profit-led framework. In this regard, the oscillations in Keen's model are distribution-led, i.e. they are not generated purely by real-

[1] Minsky (1986, p. 86) himself argues that such a crisis is plausible theoretically, and also highlights two events in the post-War US economy, in which inflation targeting-oriented monetary policy led to a recession (*ibid.*, pp. 73, 102).

[2] Estimating interest rate cycles for all case studies, following our econometric modelling approach (see Section 4), yields evidence for interest-driven cycles only for France (see Appendix 5).

financial interactions, hence they are not financial cycles in the strict sense. Also, to be precise, Keen's model does incorporate some Minskyan elements in a Goodwin (1967) profit squeeze cycle mechanism, but his Say's Law assumption makes his model not strictly Keynesian.

As mentioned above, Minsky debt cycles models put aside the role of asset price inflation. Very few models have included such dynamics, namely the models of Taylor and O'Connor (1985), and Ryoo (2010, 2013). Focusing on Ryoo's PK Minsky models, his benchmark model is constituted of three variables: output, the desired debt ratio, and the expected return on equities. The oscillations in this model occur from the interaction between the desired debt ratio and the expected return on equities, dragging along the GDP growth rate. This rationale is -more or less- similar to the model of Beja and Goldman (1980), in which the interaction between the stabilising 'long terminism' of fundamentalists and the destabilising 'short-terminism' of chartists speculators trigger the oscillations in stock prices. Contrary to the other two types of models, where all variables were observable, here two out of the three variables are unobservable, which makes its empirical assessment through estimations impossible.

3. Financial Cycles: A Review of the Empirical Literature

3.1 Empirical PK Minsky cycles literature

As shown above, the theoretical PK Minsky cycles literature has been growing since the mid-1980's and includes some quite sophisticated models which incorporate complex cycle mechanisms. On the contrary, the empirical literature on PK Minsky cycles is quite limited and has started growing only very recently. The approach followed in those studies is to estimate growth equations that include both debt flows (i.e. changes) and debt accumulation (i.e. levels), capturing an endogenous cycle created by the transition from a debt-led to a debt-burdened regime. The rationale for such a specification choice is that (short-run) changes in debt offer alternative investment financing resources, thus boost growth, while its accumulation (i.e. debt burden or levels) should affect negatively growth subsequently, creating endogenous oscillations. As argued in the previous section, this is not the case for a typical Minsky debt cycle model, since it is the ongoing boom that gives rise to optimism and therefore to positive changes in debt. That is the procyclical leverage ratio.

Palley (1994) is the first PK scholar that estimates Minsky cycles, centring on the effects of consumer debt change and real consumer debt burden on the real GNP per capita of

the US (1975Q2 – 1991Q1). Assessing those relationships, Palley estimates a GNP equation using a single-equation distributed lag approach and a 3-dimensional vector autoregressive (VAR) model which includes all three variables. Consumer debt is proxied by the *real per capita consumer installment credit* and consumer debt burden is the same indicator multiplied by the *real prime interest rate*; both from the CITIBASE. Regarding the single-equation distributed lag model, Palley's findings show that an increase in debt increases real GNP, whilst a rise in real debt burden affects it negatively. This specification also includes controls for interest rate and inflation consumer burden. His impulse response function analysis, through the VAR model, indicates that a standard deviation shock in consumer debt change produces a strong short-run positive effect on per capita GNP, whereas a debt burden shock generates a strong negative initial response by the per capita GNP. Interestingly, despite the simulated oscillations gradually dampen, the cycles do not die out, even after 100 periods.

Almost two decades later, Kim (2013) follows Palley's single-equation autoregressive distributed lags (ARDL) approach, using quarterly US data from BEA, BLS, and FED, and enriches his analysis with structural break unit root tests. The three baseline specifications of this study estimate the effect of household debt level and changes in household debt on real GDP, for the full period (1951Q1 – 2009Q1), and also control for consumer debt, household net worth and investment in levels and changes. All three estimations, based on the ARDL model, allow only for one lag for each variable (including the dependent) and no contemporaneous effects. The results suggest that a positive change in household debt boosts output, but the level of debt (i.e. debt accumulation) does have a negative impact on output, implying an underlying cyclical mechanism. At a later stage, after confirming the existence of structural breaks in the last quarter of 1982 or the first of 1983, i.e. around the period that financialisation rose, though the Chow breakpoint test, sub-sample models are estimated. More specifically, following the same specification as before, Kim estimates several models, two for the period 1951Q4 to 1982Q4, and six for the post-1983 era. Compared to the full-sample estimations, now the only explanatory variables are levels and changes of the dependent, household debt, net worth and investment. The results of the first pre-1983 estimation (which does not include any control for investment, either change or level) shows that a positive change in household debt (debt flow in terms of Kim's assumptions) affects positively growth, with the relevant coefficient being robust. Contrariwise, household debt's level, in the same equation, has a positive (but statistically insignificant) sign, i.e. an increase in debt accumulation seems to boost growth, which contradicts Minsky's debt-burdened growth

hypothesis, as interpreted by Kim. Introducing investment levels and changes fixes some serial correlation issues that existed before, but most relevant coefficients remain not statistically significant. Moving on to the post-1983 estimations, in three out of the six equations estimated, a rise in household debt's level affects negatively growth, whilst positive household debt changes seem to boost growth, as expected by the author, with the coefficients being robust.

The third PK Minskyan study on business cycles is Kim's (2016) system-based econometric approach, using the same quarterly dataset for the US. This time, the analysis starts with the estimation of three-variable VAR models of GDP, net worth, and either household, mortgage, or consumer debt (each household debt variable included at a time), supplemented by Johansen cointegration tests. The findings seem to be quite sensitive to lag length selection since only the consumer debt system with specific lag lengths (either one or three) appears to provide evidence of cointegration. Then, proceeding to the short-run VAR-based generalised impulse response analysis, the Monte-Carlo simulations' results suggest a bidirectional positive feedback loop between each of the three debt variables and GDP (in first differences). This implies that indeed the leverage ratio is procyclical, but also growth is debt-led, which according to Palley's and Kim's rationale makes sense in the short-run. As a last step, Kim reassesses potential cointegrating relationships via the Johansen test, based on the vector error correction model (VECM), and adds a consumption variable into the three-variable systems that were tested previously. This choice is based on the assumption that consumption is the main channel through which net worth and household debt affect growth. Indeed, the obtained coefficients suggest that the debt variables separately affect negatively output in the long run, whilst the multiple cointegration tests also provide evidence for similar long-run relationships. Lag lengths choices and differencing in all specifications were made relying upon the standard information criteria and unit root tests, rather than on theoretical arguments.

Besides the very few empirical business cycles' studies, PK Minskyan scholars have explored other dimensions of Minsky's analysis, such as investment effects at the firm level[3] (see Ndikumana 1999; Arza and Espanol 2008), and monetary and macroprudential shocks' impact on financial fragility (see Greenwood-Nimmo and Tarassow 2016). Ndikumana's (1999) study estimates a Tobin's Q model, in which the dependent variable is the investment-to-capital stock (at the beginning of the period) and the explanatory variables are the cash flow, interest expense, sales' growth, the percentage change in the cost of capital, (the average of)

[3] Non-financial sectors' financial fragility is also examined in few studies (see Isenberg, 1989; Wolfson, 1990; Mulligan, 2013; Nishi, 2018).

Tobin's Q, and long-term and total debt ratios. The dataset used is a firm-level one, including only the manufacturing sector over the period 1977 to 1991 (source: Compustat database). Based on fixed-firm effects and two-stage least squares specifications (using 4 lags for each independent variable), the econometric findings reported, establish that increases in cash flows and debt service do decrease the investment-to-capital ratio. This microeconomic-level finding indeed provides support to Minsky's argument about debt-burdened growth. A similar model for investment is estimated by Arza and Espanol (2008), who explore total sales', total debt's, cash flows' effects on the investment-to-capital ratio, for the Argentinian economy, utilising an unbalanced non-financial firm-level panel dataset (74 firms, 1991Q1 – 2001Q4), derived from the Buenos Aires Stock Exchange database. Their estimations also include control variables for hedge, speculative, and Ponzi finance regimes, classified by the spread between cash flows and short-term debt plus the nominal lending interest rate. The fixed-effects and instrumental variable fixed-effects models estimated, show that increases in the squared value of debt lead to falls in the investment ratio, as expected. Greenwood-Nimmo and Tarassow (2016) focus on a different, more policy-oriented aspect of Minsky's insights, centring on monetary and macroprudential shocks effects on aggregate financial fragility (measured as the credit-to-GDP and the corporate credit-to-internal funds ratios), using quarterly data (1960-2007) for the US economy. Following a sign-restricted VAR econometric approach, they study the impact of a contractionary monetary shock, a credit-constrained macroprudential shock (defined as a shock which does not result in real credit or asset price boom, but has only short-run effects), and combined shocks, via impulse response functions analysis. Their main findings suggest that a contractionary monetary shock has a positive impact on financial fragility since it induces the rise of the credit-to-GDP ratio and the corporate credit ratio. Contrariwise, a credit-constraining macroprudential shock does reduce the total credit ratio but does not have a similarly significant effect on the corporate financial ratio. In terms of our contribution, these studies do show that rising indebtedness harms investment and leads to crises and that regulating credit growth reduces financial fragility to some extent -as in Minsky-, but they are not strictly relevant, because they do not examine explicitly the underlying endogenous oscillations mechanism, i.e. if firms' debt ratios increase during the booms.

3.2 Financial cycles during the Post-WII period

In recent years, apart from the strictly defined PK Minskyan studies, the wider financial cycles' and finance-driven business cycles' literature has been growing rapidly. Drehman *et al.* (2012)

and Borio (2014) apply various descriptive analysis techniques, such as Band-bass (see Christiano and Fitzgerald 1999) and Hodrick-Prescott filtering (see Whittaker 1922; Hodrick and Prescott 1997) and turning-point analysis (see Burns and Mitchell 1946). Drehman *et al.* (2012) focus on Australia, Germany, Japan, Norway, Sweden, UK, and the USA from 1960 to 2011, using quarterly data for several indicators such as assets prices, the credit-to-GDP ratio, and credit to the non-financial private sector. The frequency-based analysis shows that the financial cycles should not be analysed as regular short-term business cycles, but as medium-term cycles (i.e. 16 years or longer), while their amplitude and length appear to become significantly prolonged after the 1980's. On top of that, their turning point analysis highlights that the peaks of the financial cycles are very often related to deep economic downturns, as Minsky argued. Borio (2014) reviews the financial cycles' literature -based mainly on the aforementioned contribution- and draws similar conclusions about the relevant stylised facts, but also pinpoints the policy challenges and the absence of endogenous finance-driven business cycles models within the literature. As showed in the previous section this comment is more relevant to the neoclassical literature, rather than the PK Minskyan modelling tradition.

A similar empirical strategy has also been followed by Agnello and Schuknecht (2011) who examine the evolution of house prices from 1970 to 2007 in 18 industrialised economies, through a turning point and frequency analysis, but also through panel cointegration tests on house prices' growth and multinomial Probit models as well. As a first step, they obtain housing prices gaps through HP filtering (calculated as real house prices' deviations from the HP trend), in order to identify the boom and bust periods in each country. Their cointegration analysis is conducted for the full sample, and the upturn and downturns periods separately, highlighting that domestic credit, interest rates, and global liquidity seem to induce housing cycles. The Probit estimations outcomes underline that banking crises (dependent variable) are associated with house prices fluctuations, during booms and busts. In addition, according to the findings, financial deregulation plays a key role for domestic liquidity, thusly for house prices booms.

The studies of Claessens *et al.* (2011, 2012) shift the focus to the determinants of the duration of recessions and recoveries, and their amplitude, based on quarterly datasets (1960Q1 – late 2000's) of 21 and 44 countries, respectively. The descriptive part of the studies (i.e. turning point analysis) confirms that financial cycles tend to have lower frequencies and be deeper than regular business cycles like most relevant studies contend. Moreover, equity and housing cycles' amplitudes appear to be longer than credit cycles', but the degree of synchronisation among them increases over time. Moving on to the panel estimations of

financial downturns' determinants (dependent variables: either credit, or house prices, or equity prices), controlling for trade and financial globalisation in the post-1980's era shows that financial cycles indeed amplified during that period. The last finding of Claessens *et al.* (2011, 2012) panel regressions is that recessions become deeper and longer when the downturns in credit and asset prices become synchronised.

Another study that examines financial variables' per capita GDP's growth effects in the post-WWII era is that of Bezemer *et al.* (2015), whose empirical strategy emphasizes on the distinction between credit stocks and flows, like Kim (2013). The estimations use a 46-country panel (1990-2011), containing controls for government spending, trade, inflation, and education. The results of the first round of panel estimations, based on the FE and system-GMM approaches, signify that either total credit stocks', or total credit flows' coefficients are hardly statistically significant in any of the cases. Distinguishing between non-financial and asset market credit yields more interesting results, following the same estimating approach. More precisely, most specifications indicate that either credit stocks or flows affect negatively growth, with the coefficients being statistically significant. This holds for the estimations within the non-financial credit and the asset market credit context. Similar findings are reported for estimations based on a similar industry-level dataset and, also, for the interaction between stocks and flows (calculated as credit stock multiplied by credit flow) using the initial macro dataset. In those cases, the results hold for total credit, as well as for its aggregates.

Furthermore, Mian *et al.* (2016) explore empirically household debt's impact on growth (30 countries, 1960-2012) -among other things- arguing that a large-scale reduction in the household debt-to-GDP ratio is related to future increases in growth. Their strategy includes an interesting attempt to capture longer cycles by applying longer differences, focusing on the change over 3 periods. Furthermore, their distributed lags specification is of some interest as well, since its benchmark form incorporates 3 lags forward for the dependent (real GDP growth) and 1 lag for the independent variables, i.e. changes in household and non-financial firms' debt-to-GDP ratios. The vast majority of those estimations prove that the household debt ratio seems to consistently influence negatively growth, using mainly the country FE approach, but also the Arellano-Bond GMM methodology in one case. Those results do not appear only in the full sample period, but also in the post-1980's, pre-1990's, pre-2000's eras and even when examining developed and emerging economies separately. The last step of their growth effects analysis is to focus on the global level, by taking the sample averages of the variables and estimating the model based on a time series approach, using the same specification.

Similarly to what reported previously, in all specifications the coefficients for the 3-period change in the household debt-to-GDP ratio are systematically negative and robust.

3.3 Quantitative macroeconomic history literature

The remaining part of the literature comes from the field of quantitative macroeconomic history, which utilise historical macroeconomic data (~1870-2013) as the present study does. Schularick's and Taylor's (2012) paper is one of the seminal contributions within this field. Using a 14-country dataset which roughly covers the period from 1870 to 2008 (collected from various sources by the authors[4]), they focus on several financial indicators such as total credit, (broad and narrow) money, bank assets, and a binary variable for financial crises. For their estimations, based on variations of Logit and Probit panel models, they use the financial crises binary variable as the dependent and include five lags for a single independent variable which is the change in the logarithm of either total credit, total loans/GDP, or broad money. The findings underline that either the level of total credit or the real total loans-to-GDP ratio do matter since their coefficients have the expected signs and are strongly robust in most cases. These results are true for several specifications including country and time fixed effects (or both) and for the pre- and post-WII eras. The authors also highlight that while it seems that total credit is strongly correlated with financial crises, the same is not true for the money variables which appear to be much less important, especially after WWII. As a robustness check, few more specifications are estimated, now including changes in the logarithm of nominal stock prices (again, 5 lags included), besides total credit, and combinations of the two (i.e. multiplying the ratios) in order to study stocks effects in the context of financial development, based on 5-year moving average Logit approach. The main outcomes of those estimations are that once again is confirmed that credit growth is associated with financial crises, whereas asset prices matter as well -given an already developed, large financial sector.

Jordá *et al.* (2013) use the same historical macroeconomic dataset as Schularick and Taylor (2012), focusing also on credit's impact on the change in the logarithm of real GDP per capita, rather than only on financial crises events. Their first set of -unconditional path- log real GDP per capita estimations use only two binary variables as explanatory, one for real and one for financial recessions, and examine their cumulative effects -separately- over a five-year horizon. The findings show that in Year 1 the effects are quite close and robust, but that changes

[4] See http://www.macrohistory.net/data/

over time since it seems that financial recessions' negative growth effects last longer throughout time. A novel element of this study is that it also controls for excess credit, which is defined as the percentage change of the loans-to-output ratio compared to the last expansion period. This measure is used as a proxy for the 'speed' of an economy's leverage ratio's increase over time, i.e. the degree of financialisation. Testing this factor, the authors expand their previous specification by incorporating two more interaction explanatory terms: excess credit multiplied by the financial and real recessions, respectively. Indeed, the statistically significant results of those regressions confirm that the combination of a financial crisis during an excess credit period, i.e. a 'financialised' era, leads to deeper recessions and lasting negative growth effects. The final robustness test for the findings is made by introducing several controls in both specifications mentioned above, such as the inflation rate, short- and long-term interest rates, the investment-to-GDP ratio, the growth rate of real loans per capita, and the current account-to-GDP ratio. Overall, the results of these conditional regressions, in terms of the main variables of interest, remain similar qualitatively and as regards their statistical significance. Despite finding some worth-mentioning results that confirm credit's harmful impact on growth, as the authors admit, their econometric approach does not impose a 'tight theoretical frame *a priori*' on their estimating strategy (see Jordá *et al.* 2013, p. 25).

Centring on the effects of house and equity price bubbles, Jordá *et al.* (2015) estimate equations for the full sample and the post-WWII era, using Logit and Probit panel models for the same historical macroeconomic dataset, expanded for house prices. The first round of estimations uses a financial crises binary variable as the dependent and housing bubbles, equity bubbles, or both bubbles multiplied by the credit level as independents, in order to test for the interaction among them. The robust findings show confirm once again that credit is strongly correlated with financial crises, whilst the variables for housing bubbles and both bubbles combined also seem to be associated with financial crashes as well. Those results remain quantitatively and qualitatively similar in the full sample and post-WWII periods. Shifting the focus on the cumulative change on the logarithm of real GDP per capita, like in Jordá *et al.* (2013), over a five-year horizon, the findings indicate that both housing and equity bubbles harm growth, especially in eras of high credit. The regression results provided demonstrate that they hold even if one includes macroeconomic controls. On the whole, quantitatively, housing bubbles' impact appears to be the most harmful for growth, particularly when such a bubble is fueled by credit.

Aikman *et al*. (2015), besides estimating Logit and Probit models, similar to those of the aforementioned studies, also utilise Band-bass filtering and spectral density analysis, using the same dataset used by the previous studies. Their conclusions on cycles' frequencies are similar to those of Drehman *et al.* (2012) and Borio (2014) for the post-WWII period, i.e. credit cycles tend to be substantially longer (roughly four times, as they report) compared to the regular business cycles. Regarding their estimating strategy, the follow the same specification and estimating technique as Schularick and Taylor (2012). Their Logistic estimations (full sample and sub-sample, excluding war years) suggest that credit cycles are associated with financial crises, while money seems to play a minor role. The final part of their empirical investigation includes cross-country correlation analysis through Cumulative Distribution Functions (CDF) for the post-WWII periods, comparing the 1945-79 and the 1980-2008 eras. While synchronisation among countries has been increased during the financialisation period, the outcomes of the relevant tests (Wilcoxon rank-sum and Jenrich's tests) point out that, still, there is no absolute convergence, by any means.

Lastly, the most recent paper by Jordá *et al.* (2016) gives prominence to credit disaggregation and specifically to mortgage credit, excluding the two highly volatile world war periods. Once again, the same historical macroeconomic dataset is used, now including three additional countries (Belgium, Finland, and Portugal). The full sample, pre-WWII, and post-WWII Logit panel estimations (no controls included) verify that, generally, both mortgage and non-mortgage debt is robustly correlated with financial crises. However, interestingly, in the post-WWII estimations, the coefficients of non-mortgage debt are not statistically significant, implying that real estate lending becomes relatively more important after 1945. Moving on to the robustness check estimations, the authors disaggregate mortgage debt further, by separating commercial and residential mortgages, and include a global factor (*the share of PPP adjusted GDP of countries that are in a financial crisis*). The global factor appears to be robust in almost all specifications, but it seems that only residential, and not commercial, mortgages are now statistically significant. It is also worth mentioning that if one includes only the global factor control into the specification that includes only total mortgage and non-mortgage loans as explanatory terms, non-mortgage debt's coefficient becomes robust. The last round of estimations of this paper follows the usual approach in quantitative macroeconomic history studies and shifts its focus on the effects of financialisation on real per capita GDP. Like in Jordá *et al.* (2013), the cumulative change in the log of real GDP per capita is studied over a five-year horizon, based on a Weighted Least Squares (WLS) approach using inverse

weighting-score weighting (see Jordá 2005) and controlling for the same factors as Jordá *et al.* (2013). Including only two binary explanatory variables, one for real and one for financial recessions, reconfirm the usual findings of financial crises impact on growth. Expanding the specification for either total private credit, or both its aggregates (mortgage and non-mortgage debt) for the full sample and the pre- and post-WWII periods, the main conclusion remain the same with the aforementioned empirical studies, i.e. overall total credit and its aggregates do play an important role for growth declines, and mortgage debt' importance became relatively more important during the second half of the 20th century. Five-year cumulated responses analysis for real per capita GDP, real investment per capita and real lending per capita -building on the distinction between mortgage and non-mortgage debt shocks- underlines that when a crisis is associated with a credit boom, recessions tend to be longer and recoveries slower. In particular, after WWII mortgage booms led to deeper depression projections.

3.4 Discussion of the existing empirical debt-driven cycles literature

As demonstrated in Section 2, the two fundamental Minskyan relationships that govern an endogenous debt-driven cycle is the procyclicality of the leverage ratio and debt-burdened growth. Attempting to classify the existing empirical literature on debt-driven cycles and relate it with our discussion of the Minsky debt cycles models and our contribution, we may distinguish several different methodological approaches and shortcomings. First, the PK Minsky cycles studies (Palley 1994; Kim 2013, 2016) use both single-equation and system-based (VAR) estimating strategies, centring on household debt measures impact on growth, even in the context of the systems. The growth equations estimated for the post-WWII US economy are modified versions of the Minsky models' growth equation, that include debt both in level and in first differences, in order to contrast the short- and long-run effects. Apparently, the cyclical mechanism tested in those studies is quite different from Minsky's original assumptions, since the authors hypothesize that cycles are generated by the shift from a debt-led to a debt-burdened growth regime, overlooking leverage ratio's procyclicality[5]. Second, another part of the existing literature focuses on estimating debt's growth effects, through panel data estimations, using datasets for the post-WWII period (e.g. Bezemer *et al.* 2015; Mian *et al.* 2016). Indeed, their findings do provide supporting evidence for the debt-burdened growth hypothesis, either in the context of household or business debt. Yet, ignoring leverage ratio's

[5] Indeed, Kim (2016) finds a procyclical leverage ratio and mentions that this result is in line with Minsky's assumption, but does not stress its importance for endogenous oscillations.

procyclicality, no safe conclusion can be drawn about the endogeneity of the oscillation mechanism, which is a fundamental element in Minsky's writings and in the Minsky modelling literature. Third, several studies examine debt-driven (and asset-driven) cycles' synchronisation with growth cycles through probabilistic and logistic panel data regressions, mainly using historical macroeconomic data (e.g. Schularick and Taylor 2012; Jordá *et al.* 2013, 2015, 2016; Aikman *et al.* 2015), as the present study does. Estimating the impact of financial crises on GDP growth and the effects of private credit on the probability of a financial crisis, their econometric results highlight that a strong correlation between credit and growth fluctuations does exist, avoiding using any specific, restrictive theoretical assumptions. Notwithstanding that this implies an underlying relationship between the two variables, synchronisation itself does not give us enough information about the causality, which is of great significance for any endogenous mechanism.

The aim of our study is to address most of those shortcomings. To begin with, as discussed more thoroughly in the next section, I evaluate endogenous debt-driven cycles by estimating pairs of equations, based strictly on the differential equation systems of the existing Minsky models. Thereby, besides testing the burdened-growth assumption, I explicitly examine leverage ratio's procyclicality as well, which allows us to derive more accurate conclusions about the endogeneity and the causality of the underlying debt-driven cycle mechanism. Also, in terms of the narrow PK empirical literature, it is the first time that a business cycle study uses historical macroeconomic data. Finally, to the best of our knowledge, the present econometric study is the first one among the finance-driven cycles literature that utilises time series analysis using historical time series, enabling us to examine country-specific information, which in a panel data context is omitted. Table 1 below summarises the different methodological approaches, the historical periods covered, and the main findings of the existing empirical literature.

Table 1: Overview of related empirical studies

Authors	**Dependent variables**	**Financial variables**	**Data**
Palley (1994), Kim (2013, 2016)	GDP, per capita GDP	Consumer, Household, Mortgage debt	USA, quarterly (1975-1991, 1951-2009)
Greenwood-Nimmo and Tarassow (2016)	Financial fragility	Monetary and Macroprudential shocks	USA, quarterly (1960- 2007)
Claessens et al. (2011, 2012)	Recessions' and Recoveries' Durations	Credit, Asset prices	Panel, quarterly (21 countries, 1960-2007; 44 countries, 1960-2007)
Bezemer et al. (2015)	Per capita GDP	Credit stocks and flows	Panel (46 countries, 1990-2011)
Mian et al. (2016)	GDP	Corporate and Household debt	Panel (30 countries, 1960-2012)
Schularick and Taylor (2012), Jordá et al. (2013), Aikman et al. (2015)	Financial crises (binary), per capita GDP	Total credit, money, bank assets, stock prices, Financial crises (binary)	Panel (14 countries, 1870-2008)
Jordá et al. (2015)	Financial crises (binary)	Total credit, House and equity prices	Panel (14 countries, 1870-2008)
Jordá et al. (2016)	Financial crises (binary), per capita GDP	Mortgage and Corporate (non-mortgage) credit	Panel (17 countries, 1870-2012)

4. Data and Econometric Modelling Approach

The historical time series macroeconomic dataset of the present study approximately covers the period from the mid- or late-19th century to date and includes two main case studies: UK and USA[6]. Since we follow a multiple-country times series approach, data are obtained from various sources, in order to estimate our system. The four main variables of interest are the real GDP, real investment, the business debt-to-income ratio, and the mortgage debt-to-income ratio. Since business debt is not directly available for the US before 1960, I approximate it by subtracting mortgage debt from total private credit to the non-financial private sector. The series for the UK come from Thomas and Dimsdale (2016), and Jordà *et al.* (2017), whereas the US data were derived from US national accounts, Shiller (2005), and Jordà *et al.* (2017). A more precise summary of individual variables' definitions, periods covered, and data sources

[6] I would like to thank Erik Bengtsson for providing us big part of the historical time series dataset I use for the UK and the USA, but also for several other countries (see Appendix 1).

can be found in Appendix 1, whilst Appendix 3 summarizes the results of the augmented Dicky-Fuller (ADF) unit root tests. Summary statistics about the relevant indicators can be found in Table 2 right below, where BDEBT is the business (non-mortgage) debt-to-GDP ratio, MDEBT is the mortgage debt-to-GDP ratio, I is real investment (in billion pounds, 2013), and GDP is real gross domestic product (in billion dollars, 2009).

Table 2: Summary Statistics

	USA				UK			
	BDEBT	*Δ(GDP)*	*Δ(I)*	*MDEBT*	*BDEBT*	*Δ(GDP)*	*Δ(I)*	*MDEBT*
Mean	0.205	0.030	0.007	0.214	0.183	0.019	0.022	0.160
Median	0.205	0.032	0.048	0.187	0.191	0.022	0.032	0.101
Max	0.320	0.158	0.591	0.432	0.354	0.101	0.604	0.718
Min	0.059	-0.147	-2.053	0.061	0.063	-0.112	-0.454	0.013
First ob.	1889	1930	1889	1889	1880	1851	1851	1880
Last ob.	2013	2015	2015	2013	2009	2015	2015	2009
# obs.	125	86	126	125	130	165	165	130

As outlined in Section 2, an endogenous debt-driven business cycle model can be reduced into a simple pair of behavioural difference equations, which give us the necessary conditions for interaction-driven oscillations, following the relevant Jacobian matrix (see (1)):

$$g_t = (A_1 + 1)g_{t-1} + A_2 d_{t-1} \quad (4)$$

$$d_t = B_1 g_{t-1} + (B_2 + 1)d_{t-1} \quad (5)$$

where g denotes the *growth rate,* and d is debt. Equations (3) and (4) are the econometric equations I estimate, hence the necessary conditions[7] for Minsky interaction cycles are that coefficient A_2 must be negative (debt-burdened growth) and, simultaneously, that coefficient B_1 must be positive (procyclical leverage ratio).

Since the selected lag structure is quite minimalistic, corresponding exactly to the relevant difference equations' system, our reduced form equations are technically misspecified. Estimating the two equations through ordinary least squares (OLS) will obtain results with serially correlated error terms. To overcome this problem, I apply two solutions: (i) estimate

[7] Apparently, the sufficient conditions for instability in such a dynamic system depends on the discriminant of the Jacobian matrix, which must be negative (see Appendix 2). So, when the necessary conditions are met, we also calculate the discriminant in order to evaluate the sufficient conditions as well.

our equations through maximum likelihood (ML) allowing the error terms to follow autoregressive processes of order one (AR(1)); (ii) estimate our equations through Generalised Least Squares (GLS), allowing the error terms follow moving average processes of order one (MA(1)), i.e. use the ARMA model. Regarding the first solution, statistical identification is a potential issue, i.e. there might not be enough information in the reduced form equations to yield unbiased point estimates of the relevant structural form coefficients (Brooks, 2014, p. 309). Therefore, as first step to this approach I estimate pairs of AR(2) models for each system and examine whether we can proceed to allow the error terms to follow AR(1) processes in the reduced form based on the statistical significance of the first lagged values of the variables, i.e. the elements of the implied 2D Jacobian matrix. Accordingly, as shown in Appendix 4, allowing AR(1) error processes is applicable only for the USA, where all first lagged values are statistically significant. With respect to the ARMA model, recent research suggests that it avoids identification issues, i.e. it can effectively yield unbiased estimates from reduced form equations (see Dufour and Pelletier, 2011). Such a model can be estimated either by ML or GLS, but the results of simulation exercises (Koreisha and Pukkila, 1990; Koreisha and Fang, 2001) suggest that the GLS approach is less sensitive to the initial values than the ML approach for small sample sizes (50-200 observations). Thus, our second solution to serial correlation is to follow the ARMA-GLS approach. A crucial condition in such a model is the invertibility of the MA process, which means that it must be possible to convert it into an AR process of infinite order, i.e. the absolute value of the roots of the characteristic equation of the MA model must lie within the unit circle (Brooks, 2014, pp. 267-81). In practice, the roots are identical to the absolute value of the estimated coefficient of the moving average term, in our case the MA(1) operator, which accordingly must be less than one. I choose to estimate our models on an equation-by-equation basis, instead of using a systems approach (e.g. a VAR model) in order to avoid misspecification of one equation to affect the other. This allows assessing efficiently whether even one of the two conditions for Minsky debt-driven oscillations holds in a particular economy.

To summarise, the baseline model of our estimations is the ARMA approach, estimated through GLS, which according to the relevant literature is the most appropriate solution for serially correlated disturbance in small-size macroeconomic samples, avoiding identification problems. Alternatively, when identification issues are absent, I also estimate our pair of equations allowing AR(1) error terms, rather than MA(1), as a further demonstration of the consistency of our findings. Following the usual practice within the historical macroeconomic

data econometric studies, I estimate the model for the full-sample and sub-sample periods as well, evaluating potential regime shifts after World War II.

5. Specifications and Econometric Results

Following the methodology analysis of the previous section, I evaluate the existence of an endogenous debt-driven cycle through the following equations:

$$\Delta\log(GDP)_t = \alpha_0 + \alpha_1\Delta\log(GDP)_{t-1} + \alpha_2\Delta DEBT_{t-1} + \varepsilon_{GDPt} \quad (6)$$

$$\Delta DEBT_t = \beta_0 + \beta_1\Delta DEBT_{t-1} + \beta_2\Delta\log(GDP)_{t-1} + \varepsilon_{DEBTt} \quad (7)$$

where *GDP* is real output, *DEBT* is either the business debt-to-income ratio (BDEBT) or the mortgage debt-to-income ratio (MDEBT) and ε_t the error terms. In both equations, I do apply first differences on both variables, to ensure stationarity (see Appendix 3). Also, regarding GDP, this is also consistent with the assumption of the Minsky models which refer to capital stock's growth rate rather than to its level. Additionally, I take the logarithm of real GDP to linearise the exponential trend of the series, accordingly equation (5) is in log-level form, and equation (6) is in level-log form. Here, the crucial coefficients are α_2 and β_2, which represent the off-diagonal elements of the relevant Jacobian matrix (see (1)). As pinpointed in Section 3, the existing PK Minskyan studies examine almost exclusively a modified version of equation (5) and do not stress the importance of equation (6) for the endogeneity of the business cycle mechanism. An additional logical step to our business debt estimations is to replace GDP with Investment, expecting similar effects, i.e. that rising indebtedness decrease investment growth, and that increases in the growth rate of investment will lead to riskier decisions by firms, thus to higher debt ratios. This choice is also consistent with Minsky's original story and the Minsky debt cycle models, which centre on the destabilising role of firms' behaviour, i.e. their borrowing decisions during the boom, and their investment expenditure decisions when debt ratios become unsustainable. Accordingly, I also estimate pairs of investment and business debt ratio equations of the following form:

$$\Delta\log(I)_t = \gamma_0 + \gamma_1\Delta\log(I)_{t-1} + \gamma_2\Delta BDEBT_{t-1} + \varepsilon_{GDPt} \quad (8)$$

$$\Delta BDEBT_t = \delta_0 + \delta_1 \Delta BDEBT_{t-1} + \delta_2 \Delta \log(I)_{t-1} + \varepsilon_{DEBTt} \quad (9)$$

where I is real investment, $BDEBT$ is the business debt-to-income ratio, and ε_t the error terms. Again, both variables are in first differences, in order to avoid non-stationarity, while investment is in logarithm form -like I do for GDP in (5) and (6). Analogously, our focus now is centred on the off-diagonal elements γ_1 which must be negative, and δ_2 which must be positive. In total, with respect to business debt estimations, I expect that a strong indication of endogenous debt-driven oscillations would be that either with GDP or investment, the relevant coefficients should have comparable statistically significant signs in both cases.

The rest of this section presents the econometric findings for corporate debt-driven cycles in the US and the UK, distinguishing among the full-sample, the pre-WWII, and the post-WWII eras. As a further step, I also explore the possibility of endogenous mortgage debt-driven cycles, following the same specification. This second part is inspired by the results of Jordá *et al.* (2016) who report that rising mortgage indebtedness increases the probability of financial crises, especially after 1945, but do not consider explicitly the possibility of endogenous oscillations.

5.1.1 Business debt-driven cycles - Full-sample results

Starting with the scrutiny of endogenous debt-driven cycles in the full-sample period for the US economy, I report econometric results for two different pairs of equations (Table 3). Both systems include dummy variables to control for the world war years. Pair (1) and (3) is the system of GDP and the corporate debt-to-income ratio, where I correct serial correlation by allowing MA(1) error processes. This system does yield evidence for endogenous cycles since both relevant coefficients have the expected signs and are statistically significant at the 1% level. More specifically, in specification (1) I find debt-burdened growth of -0.528, and in specification (3) a procyclical leverage ratio of 0.112. This implies that indeed US firms do increase borrowing during the booms, and simultaneously a one unit increase in the corporate debt-to-income ratio's change leads to a -52.8 per cent decrease in growth. Hence, there is robust supporting evidence for the necessary conditions for endogenous Minsky corporate debt-driven cycles between 1929 and 2015. Since at this stage I centre on corporate debt and firms' behaviour, growth cycles should be primarily driven by investment expenditure. Accordingly, to confirm the strength of the findings, I replace GDP with Investment (I) and re-

estimate the system allowing again MA(1) error terms (specifications (2) and (4)). This change also allows us to cover a quite longer period since the Investment series for the USA begin in 1890. In terms of statistical significance and signs of the relevant coefficients, the results remain similar. Here, the negative effect of the business debt ratio on the Investment rate becomes much stronger (-3.989), compared to the GDP estimations. Moreover, the leverage ratio remains procyclical, with its magnitude remain become smaller compared to the GDP estimations. i.e. 0.023. Regarding post-estimation diagnostics, the main priority is to confirm the absence of serial correlation, which is the main issue I intend to solve by allowing MA(1) error terms. In all four equations, according to the Breusch-Godfrey serial correlation tests, the null hypothesis of no serial correlation cannot be rejected. The White test indicates heteroskedasticity issues in all four equations. Regarding invertibility, in all four specifications applied the inverted MA roots, i.e. the absolute values of the estimated coefficients of the MA(1) terms, are below 1, therefore the MA processes are indeed stable. Overall, our estimations strongly suggest the existence of endogenous corporate debt-driven cycles in the US economy, either in the context of GDP-Corporate debt or in the context Investment-Corporate debt systems, for the full sample period, i.e. from the late 19th / early 20th century to date. Comparing the magnitudes of the coefficients of the two systems, the findings point out that the corporate debt ratio is more sensitive to increases in Investment than it is to changes in growth, whilst rising business debt accumulation decreases Investment growth substantially more than total demand growth. Calculating the length of the interaction cycle I find that it is 16 years for the GDP growth-corporate debt system and 11.3 years for the investment growth-corporate debt system.[8] In addition, the Jacobian discriminant is negative in both models, thus the sufficient condition for oscillations is met.

Moving on to our econometric estimates for endogenous business debt-driven cycles in the UK economy, over the period 1882 to 2010, as in the case of the USA I report two different systems of specifications (Table 4), both based on the ARMA model, since again allowing AR(1) errors is not applicable due to identification issues (see Appendix 3). Specifications (1) and (3) are the GDP-Corporate debt system of equations, while specifications (2) and (4) are the Investment growth-corporate debt system. According to specification (3), UK's leverage ratio is procyclical (0.100) and statistically significant at the 5% level, which implies that the euphoria of the boom did give rise to business indebtedness, between 1882 and 2010. The coefficient is slightly smaller in magnitude compared to the relevant coefficient for the USA,

[8] The interaction cycle length of the 2D system is calculated following Stockhammer et al. (2018, p. 6).

which means that debt accumulation seems to increase less rapidly during the boom period. Also, I find that the subsequent rise in debt does have negative effects on GDP growth, but the relevant coefficient is statistically insignificant. The sign of this coefficient indicates that a one unit increase in business debt-to-income ratio's change results in a -11.4% decrease in growth, which is consistent with Minsky's assumption of debt-burdened growth. Replacing GDP with investment in the system (2) - (4) makes little difference since both relevant coefficients remain similar in terms of statistical significance and signs. Investment growth exhibits a positive effect on the business debt-to-income ratio (0.023) and is statistically significant at the 10% level. The effect of a change in business debt on investment growth remains negative (-0.397), but as in the GDP-business debt system, the coefficient is statistically insignificant. These results provide strong evidence that, historically, the corporate leverage ratio of the UK has been procyclical. Contrariwise, the effect of business debt on investment growth is found to be negative but statistically insignificant, which constitute weak evidence for debt-burdened growth. Calculating the discriminant is found to be positive for both systems, hence the sufficient condition for cycles are not met for the UK. Also, it is worth noting that allowing MA(1) error terms in specifications (1), (2), (3) did not resolve the serial correlation issues, as in the case of the USA. Introducing MA(2) errors along with MA(1) resolves the serial correlation issues, but still the effects of business debt on growth remain statistically insignificant and the Jacobian discriminant keeps its positive sign. In total, for the UK there is only econometric evidence for the procyclicality of the business leverage ratio, i.e. only for one of Minsky's endogenous debt-driven cycles hypothesis.

Table 3: USA – Corporate debt estimations (Full-sample)

USA - Corporate debt-driven cycles (Full Sample: 1890/1929 – 2015)					
	(1)	(2)		(3)	(4)
Dependent:	*Δlog(GDP)*	*Δlog(I)*	*Dependent*:	*Δ(BDEBT)*	*Δ(BDEBT)*
Δlog(GDP)t-1	0.624*** (6.272)		*Δ(BDEBT)t-1*	0.548*** (3.908)	0.446*** (3.092)
Δlog(I)t-1		0.523*** (3.648)	*Δlog(GDP)t-1*	0.112*** (3.694)	
Δ(BDEBT)t-1	-0.528*** (-2.893)	-3.989*** (-3.719)	*Δlog(I)t-1*		0.023*** (4.406)
MA(1)	-0.533*** (-3.397)	-0.521*** (-2.966)	*MA(1)*	-0.104 (-0.5518)	-0.113 (-0.631)
R-squared	0.562	0.343	*R-squared*	0.432	0.416
B-G LM test	0.235	0.673	*B-G LM test*	0.510	0.165
White test	0.000	0.001	*White Test*	0.000	0.000
Period	1929-2015	1890-2015	*Period*	1929-2015	1890-2015
Jacobian Matrices' Discriminants for each system: (1), (3): -0.233; (2), (4): -0.361					
Cycle length: (1), (3): 16.086; (2), (4): 11.318					
Notes: *, **, and *** denotes statistical significance at the 10%, 5%, and 1% levels respectively. Values for specification tests are p-values corresponding to nR2. B-G LM test at first lag only. Constant terms and dummy variables for the World War years are included but not reported.					

Table 4: UK – Corporate debt estimations (Full-sample)

UK - Corporate debt-driven cycles (Full-sample: 1882-2010)					
	(1)	(2)		(3)	(4)
Dependent:	*Δlog(GDP)*	*Δlog(I)*	*Dependent*:	*Δ(BDEBT)*	*Δ(BDEBT)*
Δlog(GDP)t-1	0.734*** (9.406)		*Δ(BDEBT)t-1*	-0.431*** (-2.758)	-0.593*** (-4.659)
Δlog(I)t-1		0.836*** (32.862)	*Δlog(GDP)t-1*	0.100** (2.076)	
Δ(BDEBT)t-1	-0.114 (-1.098)	-0.397 (-1.362)	*Δlog(I)t-1*		0.023* (1.912)
MA(1)	-0.811*** (-8.859)	-1.000 (-0.002)	*MA(1)*	0.611*** (3.969)	0.706*** (5.496)
R-squared	0.327	0.572	*R-squared*	0.344	0.10
B-G LM test	0.016	0.001	*B-G LM test*	0.005	0.12
White test	0.002	0.000	*White Test*	0.004	0.74
Jacobian Matrices' Discriminants for each system: (1), (3): 1.311; (2), (4): 2.005					

Notes: *, **, and *** denotes statistical significance at the 10%, 5%, and 1% levels respectively. Values for specification tests are p-values corresponding to nR2. B-G LM test at first lag only. Constant terms and dummy variables for the World War years are included but not reported.

5.1.2 Robustness checks for the US Business debt-driven cycle – Full sample

To evaluate the robustness of our findings in the case of the USA I estimate the model in the context of a system, i.e. as a VARMA model using the Kalman filtering methodology. The VARMA estimations do confirm the robustness of the findings, as the off-diagonal elements keep the expected signs and remain statistically significant, as in the main results. Table 5 reports the results of the VARMA(1,1) maximum likelihood specifications using the Kalman filter methodology. Overall, the results remain similar to the main results even in the context of a system, confirming the robustness of the findings. The estimations suggest that increases in the corporate debt ratio decrease GDP growth by -71.8% and investment growth by -384.1%. Both coefficients are statistically significant at the 5 levels. Simultaneously, either GDP growth or investment growth induces increases in the corporate debt-to-income ratio, 0.058 and 0.022, respectively. Again, both coefficients are statistically significant at the 10 and 1% levels, respectively. Thus, these robustness estimations provide further econometric evidence that the leverage ratio of the USA has indeed been procyclical, as expected. Moreover, calculating the discriminants of the

relevant Jacobian matrices for each VARMA system, they still remain negative, therefore once again the sufficient conditions for oscillation are met. Finally, the cycle length for the GDP-business debt system is found to be 15.6 years, while the cycle length of the Investment-business debt system is 10.7 years. Unsurprisingly, both cycle lengths calculated for the maximum likelihood VARMA systems are very close to those of the equation-by-equation ARMA estimations using GLS.

Table 5: USA (1889-2010), Corporate debt cycles – VARMA(1,1)

	(1)	(2)		(3)	(4)
Dependent:	*Δlog(GDP)*	*Δlog(I)*	Dependent:	*Δ(BDEBT)*	*Δ(BDEBT)*
Δlog(GDP)t-1	0.481***		*Δ(BDEBT)t-1*	0.475**	0.419***
	(7.791)			(2.261)	(3.556)
Δlog(I)t-1		0.409**	*Δlog(GDP)t-1*	0.058*	
		(2.311)		(1.837)	
Δ(BDEBT)t-1	-0.718**	-3.841**	*Δlog(I)t-1*		0.022***
	(-2.405)	(-2.333)			(4.690)
MA(1)	0.062	-0.344	*MA(1)*	0.024	0.232
	(1.000)	(1.000)		(1.000)	(1.000)
R-squared	0.335	0.078	*R-squared*	0.265	0.232
White test	0.000	0.000	*White test*	0.000	0.000
VARMA system (1)-(3)			VARMA system (2)-(4)		
Discriminant:	-0.167		*Discriminant*:	-0.306	
Cycle length:	15.573		*Cycle Length*:	10.665	

Notes: *, **, and *** denotes statistical significance at the 10%, 5%, and 1% levels respectively. Values corresponding to specification tests are p-values. The R2 values are computed from the one-step-ahead predictions of the state space model, so differ slightly from those presented in tables 3 and 5.

Furthermore, as an additional test for the robustness of the main findings, I calculate and plot the recursive coefficients for the GDP growth-corporate debt (Figure 1) and the investment growth-corporate debt (Figure 2) systems for the USA to evaluate parameter stability. Due to the use of historical macroeconomic data, this step is essential in order to assess whether the results are driven by a sub-period. Regarding initial conditions for the recursive regressions, the anchor date is set to 1950 and the step size is set to one. Both figures suggest that all elements of the Jacobians of systems (1)-(3) and (2)-(4) (see Table 3) are indeed stable with the recursive plots

remaining within the 5% confidence intervals. Thus, our estimates are indeed stable across time and not driven by a sub-period.

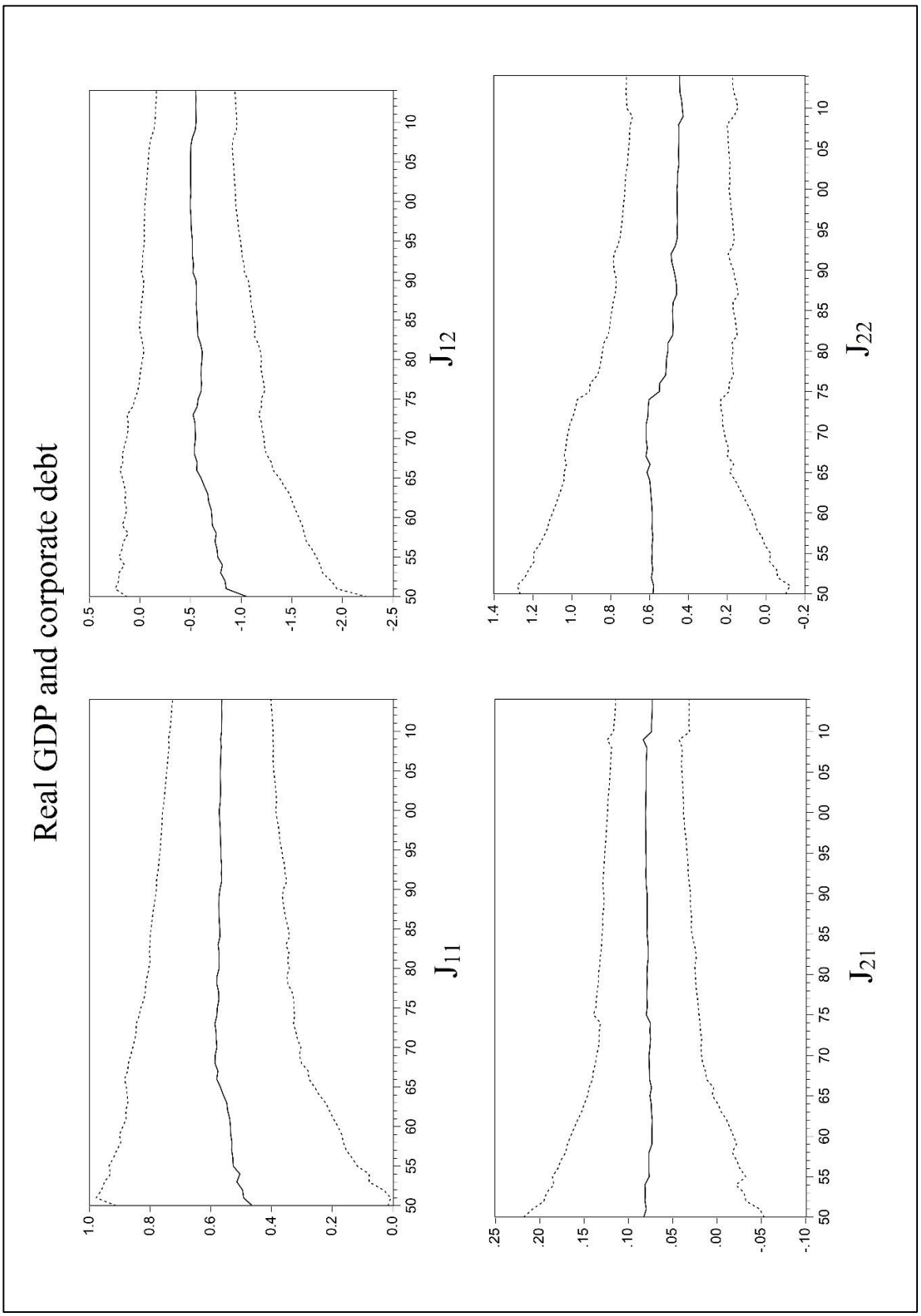

Figure 1: Recursive coefficients for the GDP growth system

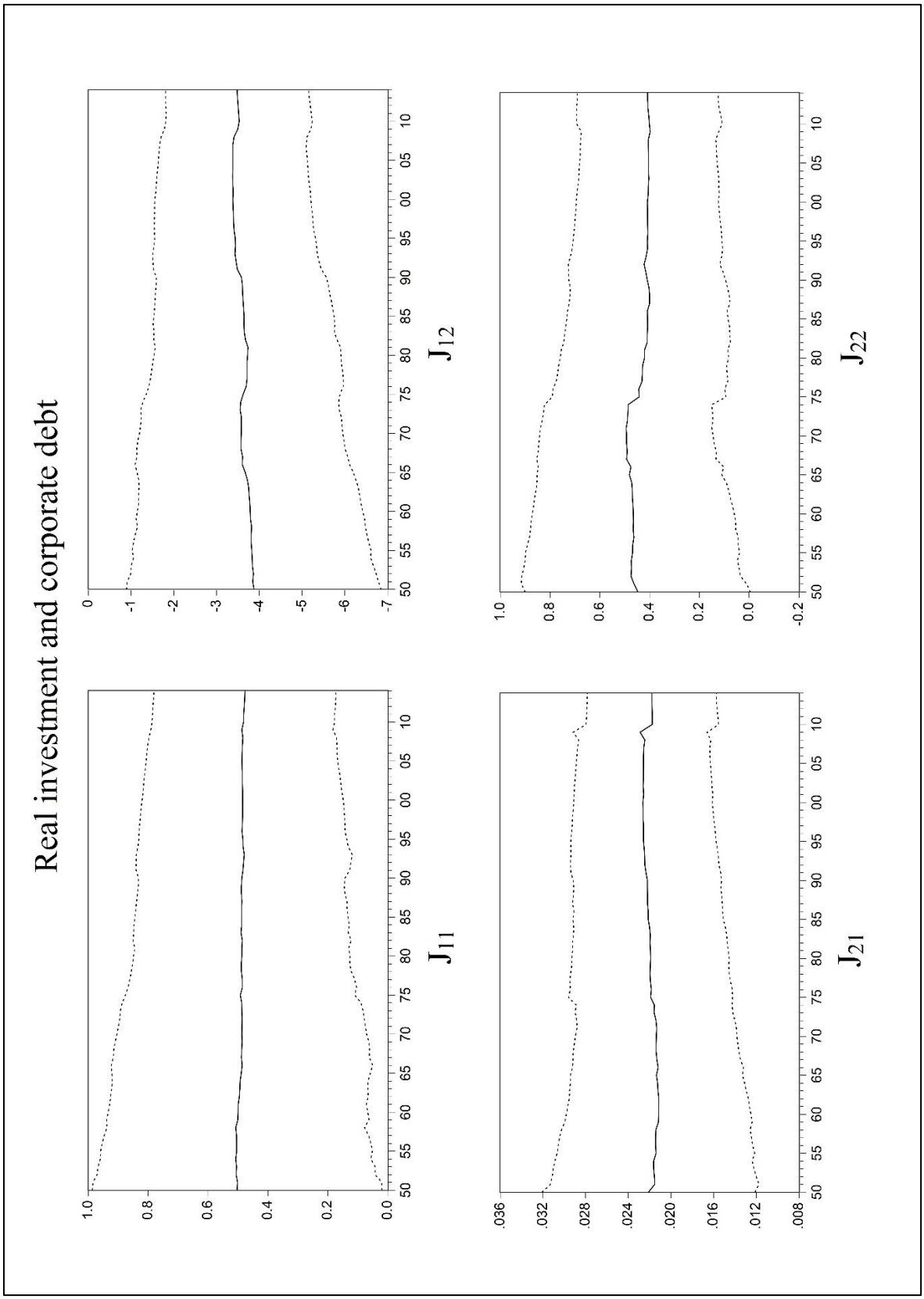

Figure 2: Recursive coefficients for the investment growth system

5.2 Business debt-driven cycles - Pre-World War II period

Moving on to the sub-sample estimations, the examination starts by exploring the late 19th – early 20th-century financialisation phase. USA is not included in the pre-WWII debt cycles estimations, because its real GDP series start at 1929, limiting the sample too much for a yearly data time series estimating framework. Therefore, I evaluate the existence of endogenous corporate debt-driven cycles only for the UK, during the pre-1939 period (see Table 6). As in the full sample estimations, only the ARMA estimations are applicable, so I estimate two pairs of equations one for the GDP-Business debt system, and the second pair of Investment and business debt. The findings change compared to the full-sample estimations. The effects of the change in the business debt ratio on GDP growth is found to be positive (0.382) and statistically insignificant. On the contrary, its effect on investment growth is negative (-0.294), but again it is not statistically significant. Hence, it is unclear whether growth in the UK has been debt-burdened or debt-led during the pre-WWII period. Estimating the impact of GDP growth on the business debt ratio we obtain a negative sign, i.e. GDP growth decreases firms' indebtedness. However, the coefficient is again insignificant. Regarding the effect of investment growth on the business debt ratio, it is found to be positive, as expected, but once again it is not statistically significant. More specifically, a one per cent increase in the growth rate seems to lead to an 11% increase in the business debt ratio. That implies that, as in the full period, UK firms do increase their indebtedness as they become more optimistic during the boom phase of the business cycle. Overall, the investment growth-business debt system confirms both hypotheses for a Minsky debt-driven cycle, but below the standards of statistical significance. Unlike the full sample estimations for the UK, the econometric findings for the pre-WWII period seem to be quite sensitive to the real variable used. While the full-sample results suggest clearly that the UK's leverage ratio is procyclical, the results for the pre-WWII period are more obscure. This implies that in the case of the UK important variables which have been crucial growth drivers are omitted.

Table 6: UK – Corporate debt estimations (Pre-WWII)

UK - Corporate debt-driven cycles (1880-1939)					
	(1)	(2)		(3)	(4)
Dependent:	*Δlog(GDP)*	*Δlog(I)*	Dependent:	*Δ(BDEBT)*	*Δ(BDEBT)*
Δlog(GDP)t-1	-0.438* (-1.710)		*Δ(BDEBT)t-1*	0.788*** (-11.274)	-0.668*** (-5.688)
Δlog(I)t-1		0.699*** (4.210)	*Δlog(GDP)t-1*	-0.062 (-1.495)	
Δ(BDEBT)t-1	0.382 (1.135)	-0.294 (-0.430)	*Δlog(I)t-1*		0.032 (1.563)
MA(1)	0.801*** (4.350)	-0.503** (-2.243)	*MA(1)*	1.000** (0.000)	0.695*** (4.607)
R-squared	0.204	0.476	*R-squared*	0.510	0.501
B-G LM test	0.040	0.154	*B-G LM test*	0.323	0.268
White test	0.000	0.080	*White Test*	0.003	0.940

Notes: *, **, and *** denotes statistical significance at the 10%, 5%, and 1% levels respectively. Values for specification tests are p-values corresponding to nR2. B-G LM test at first lag only. Constant terms and dummy variables for the World War years are included but not reported.

5.3 Business debt-driven cycles - Post-World War II period

Following the usual practice in the financial cycles' empirical literature that utilises historical macroeconomic data, the last set of our estimations focuses on the post-WWII years (see Table 7). Again, the estimations are based on the baseline ARMA-GLS methodology. The results of these estimations provide weak evidence for a post-WWII endogenous GDP-business debt cycle for the UK. More precisely, it seems that UK firms' desired investment rate grows faster than retained profits during the boom, leading to debt accumulation, since the effect of GDP growth on the change in the business debt ratio is found to be positive (0.154), i.e. an one unit increase in the growth rate triggers a 15.4% rise in the debt ratio (spec. (5)). This coefficient is statistically significant at the 10% level. At the same time, the effect of the change in business debt ratio on GDP growth has the expected negative sign (-0.251) and is statistically significant at the 10% level (spec. (1)). The coexistence of rising indebtedness during the euphoria of the boom and the negative effects of the subsequent debt payments creates the necessary conditions for endogenous debt-driven oscillations. Nevertheless, while the necessary condition is met, the discriminant of the implied Jacobian of this system is positive, thus the sufficient condition is not met. In

specifications (2) and (6), which is the system where I replace GDP growth with investment growth, the off-diagonal coefficients keep their expected signs, i.e. changes in the business debt ratio decrease investment growth and investment growth exhibits a positive effect on the change of the business debt ratio. In addition, the discriminant of the Jacobian of the system (2)-(6) is negative, which suggest that the sufficient condition is met. However, both coefficients of the off-diagonal elements are not statistically significant. Overall, these findings constitute weak evidence for the existence of a post-WWII business debt-driven cycle in the UK.

Regarding the USA, the effect of GDP growth on the business debt ratio keeps the expected positive sign (0.004), but becomes substantially weaker compared to the full sample result and it is not statistically significant (spec. (7)). Similarly, the impact of the change in the business debt ratio on GDP growth is statistically insignificant as well (spec. (3)), despite it does keep its negative sign (-0.126), as in the full sample results. The discriminant of the Jacobian matrix of the system (3)-(7) is negative, which provides evidence that the sufficient condition is met. Nonetheless, as both off-diagonal elements are statistically significant, the evidence for cycles is considered as weak. After replacing GDP growth with investment growth, s notable change is observed, since the effect of the change in the business debt ratio on investment growth becomes positive (spec. (4)). The impact of investment growth on the change in the business debt ratio remains positive at 0.015 (spec. (8)). As in the GDP-business debt system, the coefficients of both off-diagonal elements of the implied Jacobian are statistically insignificant, thus there is no evidence for endogenous cycles.

In a nutshell, the post-WWII estimations suggest that there is some weak evidence for Minskyan debt-driven business cycles in the UK over the period 1945 to 2015. Unlike the full sample period, for the USA there is no evidence for business cycles endogenously driven by interactions between the corporate debt ratio and either GDP growth or investment growth.

Table 7: USA and UK – Corporate debt estimations (Post-WWII)

USA and UK - Corporate debt-driven cycles (1945-2015)									
	(1) UK	(2) UK	(3) USA	(4) USA		(5) UK	(6) UK	(7) USA	(8) USA
Dependent:	*Δlog(GDP)*	*Δlog(I)*	*Δlog(GDP)*	*Δlog(I)*	Dependent:	*Δ(BDEBT)*	*Δ(BDEBT)*	*Δ(BDEBT)*	*Δ(BDEBT)*
Δlog(GDP)t-1	0.648*** (5.572)		0.110 (0.034)		*Δ(BDEBT)t-1*	-0.029 (-0.088)	0.132 (0.396)	0.125 (0.368)	0.194 (0.656)
Δlog(I)t-1		0.096 (0.318)		0.670*** (8.054)	*Δlog(GDP)t-1*	0.154* (1.680)		0.004 (0.102)	
Δ(BDEBT)t-1	-0.251* (-1.895)	-0.405 (-0.397)	-0.126 (-0.329)	0.032 (0.061)	*Δlog(I)t-1*		0.017 (1.079)		0.015 (1.604)
MA(1)	-0.464** (-2.591)	0.204 (0.662)	0.280 (0.832)	1.000 (-0.001)	*MA(1)*	0.361 (1.190)	0.218 (0.656)	0.245 (0.735)	0.038 (0.114)
R-squared	0.286	0.073	0.079	0.319	*R-squared*	0.156	0.10	0.122	0.151
B-G LM test	0.010	0.790	0.638	0.450	*B-G LM test*	0.034	0.331	0.443	0.692
White test	0.673	0.000	0.000	0.000	*White Test*	0.011	0.853	0.000	0.004
Jacobian Matrices' Discriminants for each system : (1), (5): 0.304; (2), (6): -0.026; (3), (7): -0.002; (4), (8): 0.228									

Notes: *, **, and *** denotes statistical significance at the 10%, 5%, and 1% levels respectively. Values for specification tests are p-values corresponding to nR2. B-G LM test at first lag only. Constant terms are included but not reported.

5.4 Minskyan mortgage debt – growth cycles

In one of their recent papers, Jordà *et al*. (2016) argue that, during the Post-WWII period, business cycle fluctuations appear to be more closely correlated with mortgage debt, rather with non-mortgage loans, based on evidence from logistic and probabilistic panel data regressions. Our findings for the same period, reported in the previous sub-section, also highlight that corporate debt-demand endogenous interactions do not create the conditions for endogenous oscillations. Inspired by the results of Jordà *et al*. (2016), I shift our focus on scrutinizing the possibility of endogenous mortgage debt-driven cycles in the post-1945 era.

As the first stage of our evaluation, I follow the Logit estimation strategy of Jordá *et al.* (2016), but in a time series context, focusing on our two case studies, UK and USA in the post-WWII period. I estimate three specifications, exactly as the aforementioned study does: (1) where the single explanatory variable is the mortgage debt-to-income ratio; (2) where the single explanatory variable is the corporate debt-to-income ratio; and (3) where I use both ratios. As reported in the table below (specifications (1) and (3)), the effects of rising mortgage ratios on the probability of a financial crisis (*FIN_CRISIS*) vary in terms of signs and robustness. While in most cases its effect is positive, as expected, but not statistically significant, in the case of specification (3) for the UK the sign is negative and robust, suggesting that rising mortgage indebtedness decreases the probability of a crisis. On the contrary, the signs of the corporate debt ratio's coefficients are consistently positive for both countries, as expected. More precisely, in the case of the UK business debt ratio's coefficients vary from 16.73 to 91.309 and both are statistically significant, which indicates that the probability of a financial crisis increases remarkably, as corporate debt accumulation escalates. Comparing the magnitude of the coefficients of the two debt ratios, again business debt's impact seems to be quite larger, either in the single explanatory variable estimations ((1) and (2)) or when both explanatory variables included. One possible explanation for the important discrepancies between my results and the findings of Jordá *et al.* (2016) is that I use time series analysis rather than panel regressions. A potential issue with our estimations, which might explain the differences, is the use of time series analysis with a dependent variable with such little variation (since its value becomes 1 only on the year of the occurrence of a crisis) could yield biased estimates, given that Logit models are estimated through ML, which are quite sensitive to sample size.

Table 8: UK and USA – Financial crises Logit estimations (1945-2013)

Dependent: *FIN_CRISIS*						
	UK			USA		
	(1)	(2)	(3)	(1)	(2)	(3)
MDEBT	4.171 (1.373)		-29.262** (-2.131)	17.536 (1.403)		26.562 (1.294)
BDEBT		16.730** (2.103)	91.309** (2.341)		19.884 (0.802)	37.974 (0.876)
R-squared	0.08	0.20	0.48	0.14	0.04	0.19
LR statistic	0.163	0.025	0.002	0.102	0.373	0.167

Notes: Constant terms not reported.

To evaluate the possibility of endogenous mortgage-driven cycles, I estimate growth-mortgage debt ratio pairs of equations, following the baseline equation-by-equation ARMA-GLS specification that I previously used for the endogenous corporate debt-driven cycles (Table 9). Starting with the UK (specifications (2) and (4)), the effect of mortgage debt on GDP growth -contrary to the expected- is positive (0.185), but statistically insignificant. In addition, the effect of the change in the mortgage debt on growth is -relatively weakly- negative (-0.052) and the coefficient again is not statistically significant. Such results could indicate an anti-Minsky endogenous oscillations mechanism of debt-led growth and a countercyclical leverage ratio, but since both coefficients are not insignificant, no safe conclusion can be drawn. As reported in the previous sub-section, there is weak econometric evidence for a UK corporate debt-driven cycle over the same period. In this regard, it seems that business debt has been a more influential driver of the UK business cycle in the post-WWII era, according to our estimating methodology. Moving on to the estimations for the USA, I obtain strongly mortgage debt-led growth of 0.996 and a procyclical mortgage leverage ratio of 0.050. Only the coefficient of the former is statistically significant. This finding suggests that a one unit increase in the mortgage-to-income ratio results in a 99.6% increase in GDP growth, which is in contrast with the assumption of debt-burdened growth. Since I applied first differences to ensure stationarity, our robust mortgage debt-led growth finding for the US, despite anti-Minsky as argued in Section 3, is comparable to the similar results of Kim (2013). In general, our results show that in both case studies there is no evidence for endogenous mortgage debt-driven oscillations mechanism in the post-1945 era.

Table 9: USA and UK – Mortgage debt estimations (Post-WWII)

USA and UK - Mortgage debt-driven cycles (Post-1945)					
	(1) USA	(2) UK		(3) USA	(4) UK
Dependent: *Δlog(GDP)*			Dependent: *Δ(MDEBT)*		
Δlog(GDP)t-1	-0.111 (-0.454)	0.416** (2.186)	*Δ(MDEBT)t-1*	0.511*** (3.293)	0.888*** (10.231)
Δ(MDEBT)t-1	0.996** (2.622)	0.185 (0.820)	*Δlog(GDP)t-1*	0.050 (1.128)	-0.052 (-1.361)
MA(1)	0.470* (1.900)	0.053 (0.228)	*MA(1)*	0.315* (1.728)	-0.060 (-0.374)
R-squared	0.165	0.239	*R-squared*	0.477	0.666
B-G LM test	0.299	0. 054	*B-G LM test*	0.963	0.285
White test	0.000	0.387	*White Test*	0.353	0.289

Notes: *, **, and *** denotes statistical significance at the 10%, 5%, and 1% levels respectively. Values for specification tests are p-values corresponding to nR2. B-G LM test at first lag only. Constant terms are included but not reported.

In addition, to evaluate the possibility of endogenous oscillations driven by mortgage debt over the full sample period. I estimate the system of real GDP growth and the change in the mortgage debt-income ratio using the baseline ARMA-GLS approach. Table 10 reports the results. For the USA, I find that the mortgage leverage ratio is procyclical as expected (0.100), and statistically significant at the 1% level (spec. (3)). I also find that increases in the mortgage debt ratio decrease growth (-0.134), but the coefficient is not statistically significant (spec. (1)). Moreover, I find that the discriminant is negative, thus necessary and sufficient conditions for cycles are met. The cycle length for this system is found to be 40.2 years. Thus, for the USA there is weak evidence for endogenous mortgage-driven cycles, below the standards of statistical significance. For the UK, I find that the partial effect of real GDP growth on the mortgage debt ratio is negative and not statistically significant. With respect to the effects of real GDP growth on the mortgage debt ratio, I find a positive sign, i.e. mortgage debt-led growth, and the coefficient is again not statistically significant. Overall, I do not find any evidence for Minskyan household debt-driven oscillations for the UK.

Table 10: USA and UK – Mortgage debt estimations (Full sample)

USA and UK - Mortgage debt-driven cycles (Full sample)					
	(1) USA	(2) UK		(3) USA	(4) UK
Dependent: *Δlog(GDP)*			Dependent: *Δ(MDEBT)*		
Δlog(GDP)t-1	0.606*** (5.990)	0.359* (1.674)	*Δ(MDEBT)t-1*	0.444*** (3.108)	0.906*** (16.126)
Δ(MDEBT)t-1	-0.134 (-0.868)	0.270 (0.344)	*Δlog(GDP)t-1*	0.100** (2.424)	-0.011 (-0.671)
MA(1)	-0.604*** (-4.254)	-0.051 (-0.215)	*MA(1)*	0.618*** (5.009)	-0.065 (-0.570)
R-squared	0.515	0.275	*R-squared*	0.562	0.764
B-G LM test	0.020	0.413	*B-G LM test*	0.413	0.392
White test	0.000	0.000	*White Test*	0.000	0.096
Jacobian Matrices' Discriminants for each system: (1), (3): -0.027; (2), (4): 0.333					
Cycle length: (1), (3): 40.215					

Notes: *, **, and *** denotes statistical significance at the 10%, 5%, and 1% levels respectively. Values for specification tests are p-values corresponding to nR2. B-G LM test at first lag only. Constant terms and dummy variables for the World War years are included but not reported.

Overall, the mortgage cycle results suggest that there is some weak evidence for a US mortgage debt-driven business cycle in the full sample period. Regarding the UK and the post-1945 estimations for the USA, there is no evidence for endogenous cycles. These results do not necessarily contradict the findings of Jordá *et al.* (2016) that mortgage debt increases the probability of financial crises in the post-WWI era. The main reason is that their results indicate that major financial crises are strongly correlated with mortgage debt accumulation after 1945 and that recessions become deeper when they coincide with financial crashes, which is not a priori relevant for endogeneity. Since the financial crises binary variable takes into account only the year of a crisis' occurrence, its 'cycle' frequency is very low, which implies that it is more strongly correlated with the debt aggregate that exhibits longer cycles. On the contrary, since I focus on the interaction with GDP, whose cycle frequency is substantially higher, it is likely that regular business cycles are more strongly correlated with the debt aggregate that has a relatively higher frequency.

6. Conclusions

Recapitulating, the growing empirical literature on financial and finance-driven business cycles follows three main methodological approaches: (i) Comparison of financial and real business

cycles' duration, through frequency analysis, i.e. Band-bass filtering, Turning point analysis, or Spectral density analysis (e.g. Claessens *et al.* 2011, 2012; Drehman *et al.* 2012; Borio 2014; Aikman *et al.* 2015); (ii) Evaluation of financial and real business cycles synchronisation through Logistic and Probabilistic regressions, based on binary variables for financial crises (either as dependent or independent variable), mainly using historical macroeconomic data (e.g. Schularick and Taylor 2012; Jordá *et al.* 2013, 2015, 2016; Aikman *et al.* 2015); and (iii) Estimation of growth equations which include debt effects (e.g. Palley 1994; Kim 2013, 2016; Bezemer *et al.* 2015; Mian *et al.* 2016). Despite a growing number of studies among the literature uses historical macroeconomic data (e.g. Schularick and Taylor 2012; Jordá *et al.* 2013, 2015, 2016; Aikman *et al.* 2015), the existing PK studies by Palley (1994) and Kim (2013, 2016) cover only parts of the post-WWII period and examine only the US economy. As argued in Sections 3, another critical issue with their econometric specification is that it is not theoretically accurate with respect to the endogenous business cycle mechanism of Minsky, as it is formalised in the macroeconomic modelling literature (see Section 2), based on insights from his original writings (see Minsky 1975, 1986, 1992). While in Minsky the endogeneity of crises is rooted in the procyclicality of the leverage ratio and in debt-burdened growth, these studies estimate only growth equations expecting a business cycle generated by a medium-term regime shift from debt-led to debt-burdened growth. Also, it is worth mentioning that Minsky originally focused on corporate debt's impact on the business cycle fluctuations, rather than on household debt. The only empirical studies that incorporate business (or non-mortgage) debt effects are the papers of Jordá *et al.* (2016) and Mian *et al.* (2016), reporting supporting evidence strong correlation with the probability of a financial crisis and negative growth effects, respectively. Besides that, another important shortcoming of the existing literature is the weak theoretical background of their specifications, as it has been admitted by authors like Jordá *et al.* (2013). On the one hand, frequency analysis and Logistic/Probabilistic regressions do give us indications about cycle synchronisation but fail to provide us with more precise information about the causality among the variables, which is of great importance for the endogeneity of the cycle. On the other hand, estimating only growth equations and proving that rising indebtedness decreases growth rates is only half the endogenous oscillation mechanism.

Building on our critique of the empirical debt-driven cycles literature, I attempted to address the lack of theoretical coherence by estimating simultaneously pairs of growth and debt ratio equations, derived directly from the 2-dimensional differential equation systems of the relevant PK Minsky models (see Sections 3 and 4). That means that I explicitly focused on

both necessary conditions for the endogeneity of the cyclical mechanism, i.e. on debt's negative growth effects and leverage ratio's procyclicality as well, as Minsky does. This approach is fundamentally different from the existing PK Minsky cycles studies' methodology which implies that the boom phase occurs due to debt-led growth, which eventually becomes debt-burdened as the debt ratios rise. Indeed, such an endogenous oscillation mechanism makes sense, from a logical perspective, but neither it is consistent with Minsky's original assumptions, nor it gives us enough information about why and how the debt ratios increase during the boom. Furthermore, I utilised a historical macroeconomic dataset that includes the UK and the US, covering approximately the period from 1880 to 2015. This is the longest time horizon examined in any PK business cycle study yet, and the only time series-based econometric study within the empirical debt-driven cycles literature that uses historical data. An econometric issue that arises due to our minimalistic specification is misspecification, which results in potential serial correlation issues. In order to prevent such statistical problems, I chose to allow the error terms of our equations to follow either AR(1) or MA(1) processes, following the propositions of the relevant econometric literature (see Section 4). The confirm the consistency of our findings in the case of corporate debt, I estimate our pairs of equations using two different real variables, either GDP or Investment. Moreover, following the usual practice in the quantitative macroeconomic history literature, I estimate the models for the full period and for sub-periods, finding some worth-mentioning discrepancies.

In the case of the US economy, the full-sample estimations provide robust evidence for endogenous business debt-driven oscillations. In the first round of estimations, I estimate two pairs of equations based on GDP-business debt and Investment-business debt systems, using the ARMA-GLS model. The results confirm Minsky's hypotheses, i.e. firms increase their debt ratios in the boom period of the cycle, while the subsequent rise in indebtedness has strong negative effects on growth which eventually lead to endogenous crises. To test the robustness of our findings, I re-estimate the two pairs of equations as a system, i.e. a VARMA model using the Kalman filtering methodology. In spite of some minor variation in the magnitudes of the coefficients, the robustness check estimations yield equivalent results in terms of statistical significance and signs. Both in the main results and the robustness checks, we confirm both the necessary and the sufficient condition for endogenous cycles. Such results highlight that in the US economy the firms tend to take riskier decisions, i.e. rapidly increase their debt ratios, benefiting the rise of an unsustainable debt-driven growth model which eventually leads to systemic crises, like the 1929 and 2007 financial breakdowns. Although, our post-1945

corporate debt estimations for the USA yield statistically insignificant coefficients, both for the effect of the debt ratio on growth and for the impact of growth on indebtedness, whilst the magnitude of the coefficients shrinks, compared to the full period regressions. These results may not be that unexpected if we consider the findings of Kim (2013, 2016) who show that in the USA household, mortgage, and consumer credit's influence rose especially after the early 1980s, contributing to the current secular stagnation phase. Jordá *et al.* (2016) come up with similar conclusions about mortgage debt's post-WWII dynamics but in a panel context. To evaluate the possibility of endogenous mortgage-driven cycles, which is beyond the scope of the studies mentioned above, I estimated GDP-mortgage debt pairs of equations for the full and the post-1945 periods, based on the baseline ARMA-GLS specification used for the corporate debt estimations. The econometric findings provide weak evidence for the existence of an endogenous mortgage debt-driven cycle in the USA over the full period. It is also worth noting that the cycle length of the US mortgage cycle is substantially longer than the corporate cycle. However, unlike the aforementioned studies, I find no evidence for a post-WWII mortgage debt-driven cycle in the USA. This finding may appear to contradict Jordá et al. (2016), but this is not necessarily the case. Mortgage debt may lead to a higher probability of major crises or lead to deeper recessions, but corporate debt seems to be more influential for endogenous cycles.

Moving on to our second case study, the UK economy, our estimates provide little supporting evidence for endogenous debt-driven cycles. Regarding the endogenous business debt-driven business cycles estimations over the post-WWII era, the necessary conditions for cycles are met, i.e. debt decrease GDP growth and GDP growth increases indebtedness, with both effects being statistically significant. This result does not hold for the pre-WWII and the post-WWII periods, where the coefficients keep their signs, but the effects of business debt on GDP growth are insignificant. We may conclude that UK firms tend to take riskier investment decisions and increase their indebtedness at a fast rate over different historical periods. Nonetheless, when I replace GDP with investment, the magnitudes of the effects decrease significantly, and the coefficients become insignificant. Since UK's cycle is not corporate-driven in the post-1945 era, like in the case of the USA, I evaluate the possibility of a mortgage debt-driven cycles by re-estimating the system of equations through the baseline ARMA-GLS model. The effect of mortgage debt on growth is positive, but statistically insignificant, which again implies the absence of a strong direct linkage. The effect of GDP growth on the change in the mortgage debt ratio is positive and statistically significant, indicating that higher growth

rates lead to higher household indebtedness in the UK over the post-WWII period. The results remain identical in terms of statistical significance and signs in the full period as well. To sum up, the econometric estimations suggest that both UK firms and households increase their indebtedness during the euphoria of the boom phase of the cycle. Yet, there is little or no evidence that corporate or mortgage debt accumulation leads to slowdowns in growth, hence there is no evidence for endogenous cycles. Given the weak findings for the UK economy, it seems that neither corporate nor household debt has not been the major driver of its business cycle, but some other variable that is omitted in our regressions. In the case of an endogenous cycle, that could be a distribution-driven cycle *à la* Goodwin (1967) or a multiplier accelerator cycle.

Recapitulating and attempting to contrast our contribution with the existing literature both in terms of methodology and findings, it is useful to focus separately on its relationship with the PK studies and the quantitative macroeconomic history literature. With respect to the PK studies, the contribution of this chapter is threefold since: (a) our methodology on evaluating cycles' endogeneity is based explicitly the two fundamental Minskyan relationships, i.e. procyclical leverage ratios and debt-burdened growth, rather than assuming a cycle due to a growth regime shift process; (b) following Minsky's original narrative, I focus mainly on the interactions between GDP or investment growth and the corporate debt ratio; (c) in terms of data and case studies, I scrutinise case studies other than the US and I extend our analysis to a much longer time horizon, due to the use of historical time series. From the perspective of the quantitative macroeconomic history literature, I confirm that debt aggregates can also be important for endogenous cycles, rather than only make financial crashes more likely or recessions deeper. Also, our approach highlights that the choice of time series analysis has an impact on results since the existing historical studies yield quite different results based on panel estimations. Compared to this part of the literature, our approach is much more theory-driven, rather than exploratory, suggesting that mortgage debt might worsen recessions or induce financial crises, but corporate debt is more important for endogenous oscillations, at least in the case of the US economy. Therefore, there are two important implications of our results with respect to the economic history literature: (i) focusing on individual countries matters, since I observe important discrepancies; and (ii) strong correlation between certain debt aggregates (i.e. mortgages) and financial crises' probability does not necessarily imply the existence of an underlying endogenous oscillation mechanism. In this regard, imposing a tighter theoretical framework for estimations is crucial, since it gives us much more specific information about

the causes and consequences of financial deregulation. In total, our methodology and findings not only examine the harmful consequences of credit accumulation but also unveils the underlying causes of its expansion.

Undoubtedly, the approach of this chapter, despite giving a more precise picture for the endogeneity of a debt-driven cycle mechanism compared to the existing empirical literature, has certain shortcomings. The most notable is that I examine endogenous financial instability solely in terms of the debt ratios, rather than incorporate the role of asset price inflation. The main reason behind that choice is that the existing theoretical modelling literature that models endogenous financial cycles including both debt and asset prices (e.g. Ryoo, 2010, 2013) is based on abstract behavioural variables, such as the desired debt ratio and the expected rate of return on equities, which apparently cannot be estimated directly. Thus, developing such a formal model based on observable variables for debt and asset prices is beyond the scope of this empirical study.

Appendix

A1: Historical Macroeconomic Data sources

Table A1: Data Sources

Country	Variable	Period	Source
UK	GDP (real)	1850-2015	Thomas and Dimsdale (2016)
	Business Debt (nominal)	1880-2013	Jordà et al. (2017)
	Mortgage Debt (nominal)	1880-2013	Jordà et al. (2017)
	GDP (nominal)	1870-2013	Thomas and Dimsdale (2016)
	Exports (real)	1850-2015	Thomas and Dimsdale (2016)
	Short-term Interest Rate (nominal)	1850-2009	Thomas and Dimsdale (2016)
	Consumer Price Index	1850-2009	Thomas and Dimsdale (2016)
USA	GDP (real)	1929-2015	BEA NIPAs
	Investment (real)	1889-1929	Kuznets and Jenks (1961)
		1929-2015	BEA NIPAs
	Total Credit (nominal)	1889-2013	Jordà et al. (2017)
	Mortgage Credit (nominal)	1889-2013	Jordà et al. (2017)
	GDP (nominal)	1889-2013	Jordà et al. (2017)
	Exports (real)	1889-1929	Lipsey (1963)
		1929-2015	BEA NIPAs
	Short-term Interest Rate (nominal)	1889-2011	Shiller (2005)
	Inflation Rate	1891-2013	Shiller (2005)
France	GDP (real)	1896-2010	Piketty and Zucman (2014)
	Total Credit (nominal)	1896-2009	Jordà *et al.* (2017)
	Mortgage Credit (nominal)	1896-2013	Jordà *et al.* (2017)
	GDP (nominal)	1896-2013	Jordà *et al.* (2017)
	Short-term Interest Rate (nominal)	1896-2013	Jordà *et al.* (2017)
	Consumer Price Index	1896-2013	Jordà *et al.* (2017)
Denmark	GDP (real)	1876-1970	Kaergård (1991)
		1966-2010	Official National Accounts
	Total Credit (% of GDP)	1875-2005	Abildgren (2006)
	Mortgage Credit (% of GDP)	1875-2005	Abildgren (2006)
	Short-term Interest Rate (nominal)	1875-2005	Abildgren (2006)
	Consumer Price Index	1875-2012	Abildgren (2010)

A2: Endogenous oscillations in 2D ODE systems

A system of difference (or differential) equations exhibits endogenous oscillations if the eigenvalues of the relevant Jacobian matrix (in our case (1)) are complex conjugates (see Chiang 1984, p. 633-45). Accordingly, in such a system the roots of the characteristic equation of the Jacobian matrix are the eigenvalues (λ):

$$\lambda^2 - \lambda Tr(J) + \det(J) = 0 \;\Rightarrow\; \lambda_{1,2} = \pm\frac{Tr(J) \pm \sqrt{Tr(J)^2 - 4\det(J)}}{2}$$

Therefore, in the context of a 2-dimensional Jacobian matrix (see (1)), the sufficient condition for oscillations is that the discriminant (Δ) of its characteristic equation must be negative, given complex eigenvalues. The discriminant of a 2D Jacobian matrix can be calculated as a function of its trace and determinant, as follows:

$$\Delta = Tr(J)^2 - 4\det(J) < 0 \;\Leftrightarrow (J_{11} + J_{22})^2 - 4(J_{11}J_{22} - J_{21}J_{12}) < 0$$
$$\Leftrightarrow (J_{11} - J_{22})^2 + 4J_{21}J_{12} < 0$$

Apparently, since the term $(J_{11}\text{-}J_{22})^2$ is positive, the necessary condition for oscillations is that the product of the off-diagonal elements of the Jacobian matrix, i.e. $J_{21}J_{12}$, must be negative.

In terms of our estimations, when both estimates for the off-diagonal elements of the implied Jacobian matrix have opposite signs and are statistically significant, I proceed to the calculation of the discriminant to evaluate if the sufficient conditions are met as well.

A3: Unit Root test results

Table A2: ADF Unit Root Tests

Country	**Variable**	**ADF test**		
		Levels	*1st Differences*	*Conclusion*
UK	*Log(GDP)*	1.22 (1)	-8.43 (0)	I(1)
	BDEBT	-0.83 (0.95)	-9 (0)	I(1)
	MDEBT	1.09 (0.99)	-3.09 (0.1)	I(1)
	Log(I)	-0.725 (0.969)	-10.031 (0.00)	I(1)
	INT_RATE	-5.87 (0)	-	I(0)
USA	*Log(GDP)*	-1.08 (0.92)	-6.16 (0)	I(1)
	BDEBT	-2.11 (0.53)	-7.61 (0)	I(1)
	MDEBT	-3.64 (0.03)	-	I(0)
	Log(I)	-0.9 (0.95)	-8.62 (0)	I(1)
	INT_RATE	-6.75 (0)	-	I(0)

A4: Identification of ML estimations with AR(1) error terms

Autoregressive errors of order one are of the following form:

$$u_{gt} = \rho_g u_{gt-1} + e_{gt} \qquad (i)$$

$$u_{dt} = \rho_d u_{dt-1} + e_{dt} \qquad (ii)$$

Where e_{gt} and e_{dt} are white noise processes. Replacing equations (i) and (ii) into equations (3) and (4), we get the following AR(2) representations of our model:

$$\mathrm{g_t} = (A_1 + \rho_g)\mathrm{g_{t-1}} - \mathrm{A_1}\rho_g g_{t-2} + A_2\mathrm{d_{t-1}} + A_2\rho_g\mathrm{d_{t-2}} + \mathrm{u_{gt}} \qquad (iii)$$

$$\mathrm{d_t} = B_1\mathrm{g_{t-1}} + B_1\rho_d\mathrm{g_{t-2}} + (B_2 + \rho_d)\mathrm{d_{t-1}} + \mathrm{B_2}\rho_d\mathrm{d_{t-1}} + \mathrm{u_{dt}} \qquad (iv)$$

Equations (iii) and (iv) can be estimated through ordinary least squares. However, here only A_2 and B_1 are identifiable. If both parameters are statistically significant in the AR(2) representations (iii) and (iv), then we can proceed to estimate equations (3) and (4), allowing the AR(1) error processes (i) and (ii), using maximum likelihood. If either A_2 or B_1 is not statistically significant in (iii) or (iv), then (3) or (4), respectively, will not be identified with AR(1) errors. The results below suggest that this specification cannot be applied in our cases.

Table A3: AR(2) estimations– Corporate cycles (Full-sample)

UNITED KINGDOM					
Dependent Variable: *Δlog(GDP)*			Dependent Variable: *Δ(BDEBT)*		
Variable	Coefficient	t-stat	Variable	Coefficient	t-stat
Δlog(GDP)t-1	0.395***	4.295	*Δ(BDEBT)t-1*	0.276***	2.998
Δlog(GDP)t-2	-0.070	-0.740	*Δ(BDEBT)t-2*	0.054	0.591
Δ(BDEBT)t-1	0.086	0.513	*Δlog(GDP)t-1*	0.116**	2.245
Δ(BDEBT)t-2	-0.355**	-2.161	*Δlog(GDP)t-2*	-0.099*	-1.899
R-squared	0.173		*R-squared*	0.105	
DW stat	1.903		*DW stat*	1.996	
UNITED STATES					
Dependent Variable: *Δlog(GDP)*			Dependent Variable: *Δ(BDEBT)*		
Variable	Coefficient	t-stat	Variable	Coefficient	t-stat
Δlog(GDP)t-1	0.518***	4.592	*Δ(BDEBT)t-1*	-0.301	-1.154
Δlog(GDP)t-2	-0.088	-0.818	*Δ(BDEBT)t-2*	-0.040	-0.161
Δ(BDEBT)t-1	-0.544	-1.552	*Δlog(GDP)t-1*	3.758***	4.639
Δ(BDEBT)t-2	-0.268	-0.770	*Δlog(GDP)t-2*	-1.006	-1.253
R-squared	0.338		*R-squared*	0.259	
DW stat	1.929		*DW stat*	1.963	

Note: Constant terms' coefficients are not reported.

A5: Interest rate-driven cycle – France (Full sample)

Overall, no concrete evidence for interest-driven cycles is found in any country other than France. Again, allowing only MA(1) errors is applicable. As reported below, France's growth is slightly interest rate-burdened (-0.008), meaning that a rise in the short-term interest rate rises interest payments, thus decrease growth. Simultaneously, its interest rate seems to be very strongly procyclical (6.52), which implies that it is driven by investment demand, as the relevant business cycles models assume, creating an endogenous oscillation mechanism. Both coefficients are statistically significant, and the R-squared values of both equations are the highest among all countries (0.722 and 0.183), underlining the strength of this trivial, underlying endogenous relationship.

Table A4: France - Interest rate-driven Cycle (Full Sample)

FRANCE					
Dependent Variable: *Δlog(GDP)*			Dependent Variable: *Δ(INT_RATE)*		
Variable	Coefficient	t-stat	Variable	Coefficient	t-stat
Δlog(GDP)t-1	0.995***	52.718	*Δ(INT_RATE)t-1*	-0.015	-0.082
Δ(INT_RATE)t-1	-0.008***	-17.326	*Δlog(GDP)t-1*	6.520*	1.785
MA(1)	-0.725***	-7.383	*MA(1)*	-0.516**	-2.361
R-squared	0.722		*R-squared*	0.183	
DW stat	1.569		*DW stat*	1.794	

Notes: Constant terms' coefficients, inverted MA roots, and error variances are not reported.

A6: Post-1980 Mortgage debt-driven cycle - Denmark

The only case study in which a Minskyan mortgage debt cycle was found in Denmark over the period 1980 – 2005. Both relevant coefficients are statistically significant and have the expected signs, i.e. mortgage debt decreases GDP growth (-0.072) and, simultaneously, GDP growth boosts mortgage lending (0.280). In both equations, the values of R-squared are quite high, so their predictive power is satisfactory, whilst the Durbin-Watson statistics' values are around 1.9, rejecting the possibility of autocorrelation. Although, the inverted MA root of the debt equation is equal to unity, which indicates non-invertibility issues.

Table A5: Denmark - Mortgage Debt Cycle (Post-1980)

DENMARK					
Dependent Variable: *Δlog(GDP)*			Dependent Variable: *Δ(MDEBT)*		
Variable	Coefficient	t-stat	Variable	Coefficient	t-stat
Δlog(GDP)t-1	0.873***	4.930	*Δ(MDEBT)t-1*	0.688***	4.038
Δ(MDEBT)t-1	-0.072*	-1.772	*Δlog(GDP)t-1*	0.280**	1.994
MA(1)	-1.000	-0.000	*MA(1)*	-0.151	-0.659
R-squared	0.17		*R-squared*	0.35	
DW stat	1.90		*DW stat*	1.89	

Notes: Constant terms' coefficients, inverted MA roots, and error variances are not reported.

Chapter 2

The Comparative Political Economy of Financialisation and the Labour Share in the long-run: Evidence from France, Sweden, and the USA

1. Introduction

In recent years, the research field of financialisation has gained prominence among social scientists from different disciplines (see van der Zwan, 2014), who attempt to explain how the expansion of the financial sector and its dominance over the real economy affects socio-economic relations in the neoliberal era (e.g. Krippner, 2005; Davis and Kim, 2015). Few scholars within this literature have attempted to evaluate empirically a particular aspect of the financialisation of the economy since the early 1980s: whether it has contributed to rising income inequality, and more specifically to the reduction of the labour share. Alvarez (2015), Guschanski and Onaran (2018), Dünhaupt (2017), Stockhammer (2017), Wood (2017), and Köhler et al. (2018) provide econometric evidence that rising household indebtedness, interest and dividend payments, and financial globalisation, among other factors, play key roles for the decline in labour's bargaining power (Darcillon, 2015; Meyer, 2017), and thus exacerbate the fall in wage shares during the last four decades (IMF, 2017).

The reference point for most contemporary studies is the post-War experience, hence the arguments of the income distribution debate are commonly based on the comparison between the 'Golden Age' and Neoliberalism (Bengtsson and Ryner, 2015; Hein, 2015). This might give the false impression that the current regime is a permanent new stage of capitalism, as it was hypothesized for the 'Golden Age' as well (see Glyn and Sutcliffe, 1972), treating implicitly the current period as unique. Authors such as Esteves (2011) and Fasianos et al. (2018) examine the historical evolution of different financial variables arguing that similar patterns of increased dominance of the financial sector over the real economy have existed in many economies in the pre-1945 period as well. These findings raise the question of whether those earlier financialisation periods had similar characteristics with the current one in different countries, and whether financialisation has been associated with reductions in the wage share in historical perspective. Consequently, the main research question that this study seeks to

answer: whether financialisation has been related to reductions in labour's income share since the late 19th century, and if yes, which financial variable has been more dominant throughout time, using time series econometric analysis and utilising annual historical macroeconomic data for France (1911-2010), Sweden (1891-2000), and the USA (1929-2015). Following the mainstream typology within the Varieties of Capitalism (VoC) approach (Hall and Soskice, 2003), France is chosen as an example of an advanced coordinated continental European country, Sweden represents the Nordic statist model of capitalism, whilst the USA is examined as the archetypical liberal market economy. Although, given the time dimension of the dataset of this study, it is of great importance to evaluate to what extent those standard definitions hold in historical perspective, based on the analysis of the determinants of functional income distribution, providing a comparative political economy analysis without historical deficit (Amoore et al., 2000).

In general, a shortcoming of the existing econometric studies on labour share's determinants is the quite limited time horizon, examining at best the post-1960's period. As a consequence, most studies use panel data analysis to avoid biases due to the short time dimension, potentially omitting important country-specific information, which constitutes another significant deficiency. The single exception among them is the study of Bengtsson (2014b) who centres on Sweden's labour share using historical macroeconomic data but does not consider the impact of financialisation, trade globalisation, or technology. Therefore, the main contributions of the present study are two: First, it is the first that estimates the determinants of the wage share using historical macroeconomic data for other countries beyond Sweden; Second, it is the very first econometric study that scrutinises the impact of financialisation on the wage share extending the time horizon to the late 19th and early 20th century.

Recently, Köhler et al. (2018) have attempted to outline the different channels through which financialisation contributed to the decrease in labour's income share since the early 1980's, highlighting the roles of household indebtedness, enhanced exit options for firms, shareholder value maximisation, and rising mark-ups due to increasing financial overhead costs. Regarding the first dimension, Kim et al. (2017) have presented the theoretical argument that increased household indebtedness may decrease workers' bargaining power, since debt service commitments increase their cost of job loss, as job functions as collateral for borrowing. Thus, rising household indebtedness can contribute to rising income inequality, as workers may prefer to retain their job even with a decreasing wage rather than risk to lose it. Argitis and

Dafermos (2013) contend that this is not necessarily the case, as workers' may demand higher wages to cover their debt service commitments. Corporate indebtedness and interest rate variations may also have distributional implications because of debt and interest payments increasing financial overhead costs, but as Hein (2007) claims their effect on real wages depends on whether price mark-ups are interest-elastic or rigid, i.e. on whether capitalists have the power to pass those increases into the mark-up at the expense of workers. Centering on another distributional aspect of financialisation, the shareholder value maximisation principle, Lazonick and O'Sullivan (2000) have argued that shareholders put pressure on firms' managers to focus on keeping share prices high through raising the debt ratios or the dividend payout ratio (i.e. increase the overhead financial costs), and, subsequently, improve firms' deteriorating financial positions by squeezing wages. Evidently, there is a consensus that financialisation does play a key role for income distribution, but the expected effects of the relevant indicators bring some theoretical controversy. Since many of the factors that define the impacts of the financial variables depend on country-specific characteristics, individual country analysis can provide us with interesting insights. Especially with respect to the long time dimension of the time series of this study it is fundamental to examine the relevant financial series and evaluate to what extent the pre-WWII form of financialisation was similar to the post-1980's, i.e. whether the stylised facts for the latter period hold for the former as well in our case studies. In particular, as shown in section 2, the mortgage and corporate debt shares of GDP have the most interesting long-term patterns as private indebtedness exhibits long cycles, reaching substantially high levels even in the late 19th century, suggesting that its potential distribution impact can hold in historical perspective. In contrast, the fluctuations of the real share price index suggest that for all three case studies shareholder value orientation is a characteristic of the neoliberal phase of financialisation, rather than a historical stylised fact. Unfortunately, due to the use of historical macroeconomic data in this study, the availability of more sophisticated financialisation variables is limited, hence the analysis of this paper is restricted to the private debt ratios, the real interest rate, and the real share price index. Beside of financialisation, for the sake of completeness, other theoretical arguments related to the distributional effects of unionisation, welfare spending, trade globalisation, and technical change are examined in long-term perspective as well.

Ultimately, the econometric estimations of the present chapter, based on the unrestricted Error-Correction Model (UECM), suggest that indeed financialisation has been leading to decreases in the labour shares of our three case studies in historical perspective.

Regarding France, the results show that the negative long-run effect of household (mortgage) debt and the positive effect of welfare spending are the main drivers of its labour share. For Sweden, the findings indicate that the negative impact of the mortgage debt ratio and the positive effect of union density are the key factors for the determination of its wage share, with the latter being larger. In addition, real share prices and stock market capitalisation decrease the Swedish labour in historical context. The results for the USA show that its wage share is driven by the positive effect of welfare spending and the negative effect of financialisation. Overall, as expected by the political economy approach, indeed financialisation has been a key driver of labour's income share, as the negative effect of the mortgage ratio is the most robust cross-country finding, whilst historically welfare expenditures and unionisation have been playing central roles in certain countries.

The rest of this chapter is organized as follows: Section 2 discusses the phenomenon of financialisation in historical perspective, examining the evolution of the two main private debt aggregates and real share prices in the long-term, whose fluctuations have important behavioural consequences for income distribution. Section 3 reviews critically the theoretical arguments within the existing literature on functional income distribution's determinants, focusing mainly on recent contributions that scrutinise the impact of financialisation. Section 4 reports the main findings of the relevant econometric studies. Section 5 presents the baseline specification and the econometric methodology. Section 6 reports the historical datasets for France, Sweden, and the USA, discussing the patterns of the main explanatory variables. The results of the baseline and the robustness estimations, and the standardised coefficients are presented in Sections 7 and 8. Lastly, Section 9 summarizes the findings of this study and discusses their economic, historical, and political implications.

2. Financialisation in historical perspective

The phenomenon of the financialisation of the economy since the early 1980s, i.e. the rise of neoliberalism, and its destabilising role for the macroeconomy have been explored thoroughly by several recent studies (see Krippner, 2005; van der Zwan, 2014; Davis and Kim, 2015). Notably, Bengtsson and Ryner (2015) and Hein (2015) centre on its negative impact on income distribution in the late post-WWII period, along with other elements of neoliberalism such as trade globalisation, welfare state retrenchment, and declining unionisation. Despite those studies provide important insights on the characteristics of the dominance of the financial sector

over the economy and its linkage with the rise in income inequality in the neoliberal era, they do not examine financialisation in historical perspective.

Extending their analysis beyond the narrow post-WWII focus of the financialisation literature, few social scientists have attempted to explore whether finance-dominated periods have existed in earlier phases of capitalism as well, but without providing clear definitions of financialisation. Galbraith (1954) in his historical study of the 1929 financial crash in the USA, argues that rising household indebtedness and firms' shareholder value orientation characterised the early 20th century US economy which eventually led to the financial crisis. In spite of providing some interesting descriptive data for this historical period in the USA, Galbraith's book is more focused on depicting the attitude of the policy makers and the politicians right before and after the crisis, rather than a strictly academic study. Arguing from a Marxist perspective, Arrighi (1994) claims that a large-scale financial expansion is not a novel development since similar events have been observed even earlier than the 19th century. He contends that as the old accumulation regime struggles to retain high profitability, the shift to the financial sector to seek higher revenues is its last attempt to survive. In this regard, the financial expansion of the early 20th century is associated with the collapse of the old British regime, whilst the industrial expansion of the 'Golden Age' was the product of the rise of the new US regime (Arrighi 1994, p. xii). Accordingly, the current neoliberal shift towards the financial sector is associated with the fall of the post-WWII US regime. Arrighi's implicit definition of financialisation is heavily inspired by the classical Marxist thought, i.e. it is expressed in terms of mobility of capital towards sectors with higher returns. In his narrative, under certain historical circumstances at the international level, this sector is the financial sector, thus the economy shifts towards it. Financialisation is also studied in a historical context by Kotz (2003) who attempts to generalize the Marxist Social Structures of Accumulation (SSA) theory, into a long waves framework of interchanging regulated and liberal institutional structures, based on the experience of the US capitalism. Kotz's interpretation of financialisation here is linked to historical periods of financial deregulation, which allow banks to exert control over large non-financial firms, without clarifying how banks derive that power over the real economy though. Based on a discussion of the growth rates and the historical development of the institutional framework of the USA, Kotz outlines the 1899-1917 and 1947-75 eras as the two regulated regimes, and the 1919-37 and post-1980's periods as the liberal accumulation regimes. The absence of analysis of relevant financial variables does not allow to make clear which variables are crucial for each period (hence the potential implications for

income distribution), so financialisation is narrowly defined in institutional terms as financial deregulation. The latest relevant contribution is Fasianos et al. (2018) who review the financialisation literature within economics from a Post-Keynesian perspective, with reference to the US economic history of the 20th century. Their main conclusion is that US capitalism has experienced two long waves of financialisation, providing a periodisation similar to Kotz's (2003), by stressing the role of financial deregulation. The authors remark that the pre-WWII financialisation period shares several similarities regarding institutional structures and practices with the current one, including rising household indebtedness, shareholder value orientation (Lazonick and O'Sullivan, 2000), and free capital mobility, which evidently affect income distribution as discussed in the next section (e.g. for the impact of household debt see Kim et al. 2017 and for capital mobility see Rodrik, 1997). In spite of the interesting attempt to discuss the pre-WWII financialisation in terms of the contemporary financialisation literature, this study does not succeed in providing a clear definition of financialisation or answer precisely what are the main differences between the two finance-dominated periods. The implicit definition of financialisation is -as in Kotz (2003)- related to a broad discussion of structural changes that occurred due to financial liberalisation which is loosely connected to the discussion of the historical financial series.

Despite those studies come from different fields of social sciences or schools of thought within political economy, eventually, they draw similar conclusions, suggesting that the dominance of finance is not a novel structural change of the post-1980's neoliberalism. Apparently, most studies use the USA as a point of reference for their historical analyses of financialisation, since, probably due to data availability at the time. According to Esteves (2011), the financial sector has developed substantially in several other advanced economies as well before WWII, providing relevant descriptive statistics for Germany, France, and the UK, amongst others. Using capital account openness and foreign capital stocks as proxies for financial integration, Esteves discusses financial globalisation as a component of the broader global integration process of the late 19th and early 20th century. Overall, Esteves does not provide an explicit discussion of financialisation as a distinct phenomenon (and does not examine sophisticated financial variables), but his analysis of global financial integration suggests that the financial markets have always been a core component of the capitalist system of advanced economies, at least since the late 19th century. In this respect, given the focus of the present study, it is meaningful to study the long-term distributional effects of

financialisation, and scrutinise other countries beyond the USA, by utilising recently developed historical macroeconomic datasets.

To demonstrate that financialisation is not a novel structural development at least for the three countries of this study, I examine the graphs of three important financialisation indicators: the corporate debt ratio, the mortgage debt ratio, and the real share price index. The choice of those variables as measures of the degree of financialisation of an economy has to do with the implied structural behavioural changes that they bring into an economy, such as increased household vulnerability and shareholders' dominance over firms' management (see next Section). It is worth pinpointing that using historical macroeconomic data limits substantially the availability of better indicators for certain financialisation channels which are used in relevant studies who examine the neoliberal era, e.g. the share buyback ratio instead of real stock prices as a proxy for shareholder value orientation.

As a first step, plots of the GDP shares of the debt aggregates -the two main financial variables used in the estimations of this study- are provided, calculated using data from Jordà et al. (2017). The variables are examined in terms of shares of the national income in order to capture the relative size of the financial sector, i.e. its dominance over the economy. In Figure 1, graph (i) shows the series for France, graph (ii) the series for Sweden, and graph (iii) the series for the USA. In France, we observe that the share of the corporate debt is historically larger than the share of the household debt. More precisely, corporate indebtedness in France is substantially high even during the 1920s, between 30 and 40%, whilst it reaches its peak in the early 1970s, rather than in the financialisation period. On the contrary, household debt is relatively low until the 1950s where it starts to steadily rise, with a steeper rise since the 2000s. In Sweden, the plot shows a different financial integration process, as the pre-1930's financialisation period seems to be mainly related with the expansion of business credit, which reaches even close to 60% of GDP in the 1910s and 1920s, whereas mortgage debt varies from 10 to over 30%. The situation changes drastically in the post-WWI period, where the share of mortgage debt rises sharply from around 20% in the early 1950s to approximately 80% in the 2010s, being consistently larger than the share of the business debt. During the same period, corporate debt declines slightly between 1950 and 1975, where the two debt aggregates start moving in parallel. The picture is -more or less- similar for the USA, with corporate debt being more important in the pre-WWII financialisation era, and household debt being more dominant since the 1950s. As a conclusion, both aggregates of private indebtedness -as key financial variables related to bargaining power- have been substantially high since the late 19th century,

with some interesting cross-country and cross-period differences which depict the form of financialisation in each economy. The most notable quantitative observation about the two variables is that in France and the USA corporate debt has an overall downward trend since the early 1970s, i.e. in both countries the neoliberal financialisation experience was accompanied by a household financialisation process and a (mild) corporate de-financialisation process. This does not seem to be the case for earlier periods where both debt aggregates move in parallel -to some extent-, especially in the USA. Regarding Sweden, despite the changes in the relative importance of the business and mortgage debt ratios during the Great Depression, the two aggregates grow in parallel in the early 20th century and since the 1950s. It is worth pinpointing that even during the 'Golden Age', the most regulated era of the 20th-century capitalism in terms of the financial and the industrial sector, private indebtedness reached substantially high levels. More precisely, for all three countries either mortgage, corporate debt, or both rise steadily between the early 1950s and the late 1960s, highlighting that the dominance of the financial sector has always been critical for the economy, even during periods that it is supposed to be restricted.

As an additional step in the examination and comparison of the pre- and post-WWII financialisation periods, I also look at the historical evolution of the real share price index in our three case studies. Real share prices are examined as a proxy for the shareholder value maximisation process, depicting managers' endeavour to increase shareholders' stake by buying back shares, which constitutes an important behavioural change related to the financialisation of an economy. This eventually leads managers to attempt squeezing labour's income to improve firms' deteriorating financial position. It is true that real share prices are not an ideal proxy for shareholder value maximisation, as this indicator does not only capture financialisation as a structural process, but also financial bubbles. Given the historical focus of this study, as stated earlier, the availability of historical financial series is a significant limitation, therefore, the real share price index is considered as the best available proxy for the hypothesis of shareholder value orientation. Ideally, shareholder value maximisation would be better captured by the share buyback ratio which represents more accurately managers' attempts to retain high share prices in the short-term. As shown in Figure 2, in France real share price inflation occurred even in the pre-WWII financialisation era. Episodes of real stock price booms are observed around the 1930s, during the WWII period, and from the mid-1950's to the late 1960s. However, clearly, the most rapid boom of real stock prices occurs since the mid-1980s reaching its peak in the early 2000s, i.e. in during the neoliberal financialisation era.

Regarding Sweden, a notable pre-WWII expansion in real share prices is observed from 1900 to approximately 1920, which occurred substantially earlier than the 1930's boom in France and lasted for a longer period. Between 1925 and 1980, Swedish real share prices remain relatively stagnant, while a rapid increase occurs from the early 1980s, which escalates further from the 1990s. Great volatility appears between 1990 and 2010, which probably is an indication of a financial bubble, rather than of financialisation, as prices fluctuate in relatively short time intervals implying that they are generated by momentum traders' decisions. This is similar to what we observe in France during the same period. In the USA, we observe a boom period from the early 1950s to the 1970s, in which real share prices almost doubled. This is followed by a decline until the mid-1980s, i.e. the early neoliberal era, where real stock prices start increasing rapidly. Especially after the early 2000s, real share prices begin to fluctuate much more frequently in short time intervals as in France and Sweden. Interestingly, the fluctuations seem to be synchronised with those of French and Swedish real share prices over the period 1990-2010, implying that this high volatility period captures a bubble rather than financialisation per se.

Recapitulating, in France the pre-WWII financialisation period was characterised mainly by corporate indebtedness, while in the post-WWII period the dominance of finance is depicted mainly by the rapid rise in household debt, the relatively high levels of corporate debt (despite its sharp decline between 1970 and 1990), and real stock price inflation. In Sweden, the picture is slightly different with the notable differences that both debt aggregates rise in parallel in the post-WWII period. Real share prices' volatility escalates significantly after the 1990s, as in France, but a significant 20-year boom period occurred also in the early 20th century. Finally, in the USA, private debt aggregates have remained historically in high levels, with corporate debt dominating the pre-WWII period and mortgage debt dominating the post-WWII period, as in Sweden. Real share price inflation in the USA has occurred both in regulated Fordist and in the post-Fordist neoliberal, with the latter being much more rapid.

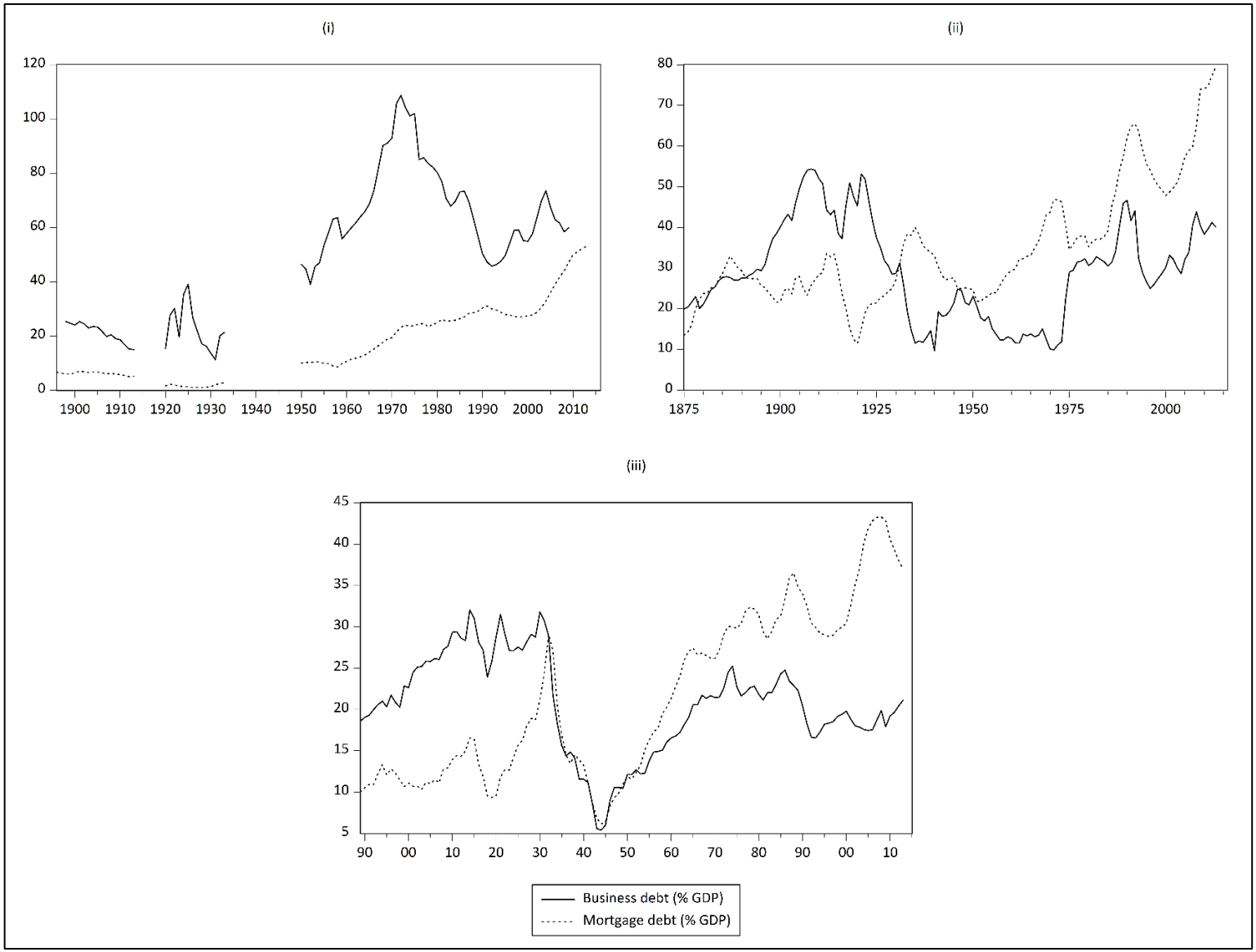

Figure 3: Private debt aggregates in historical perspective

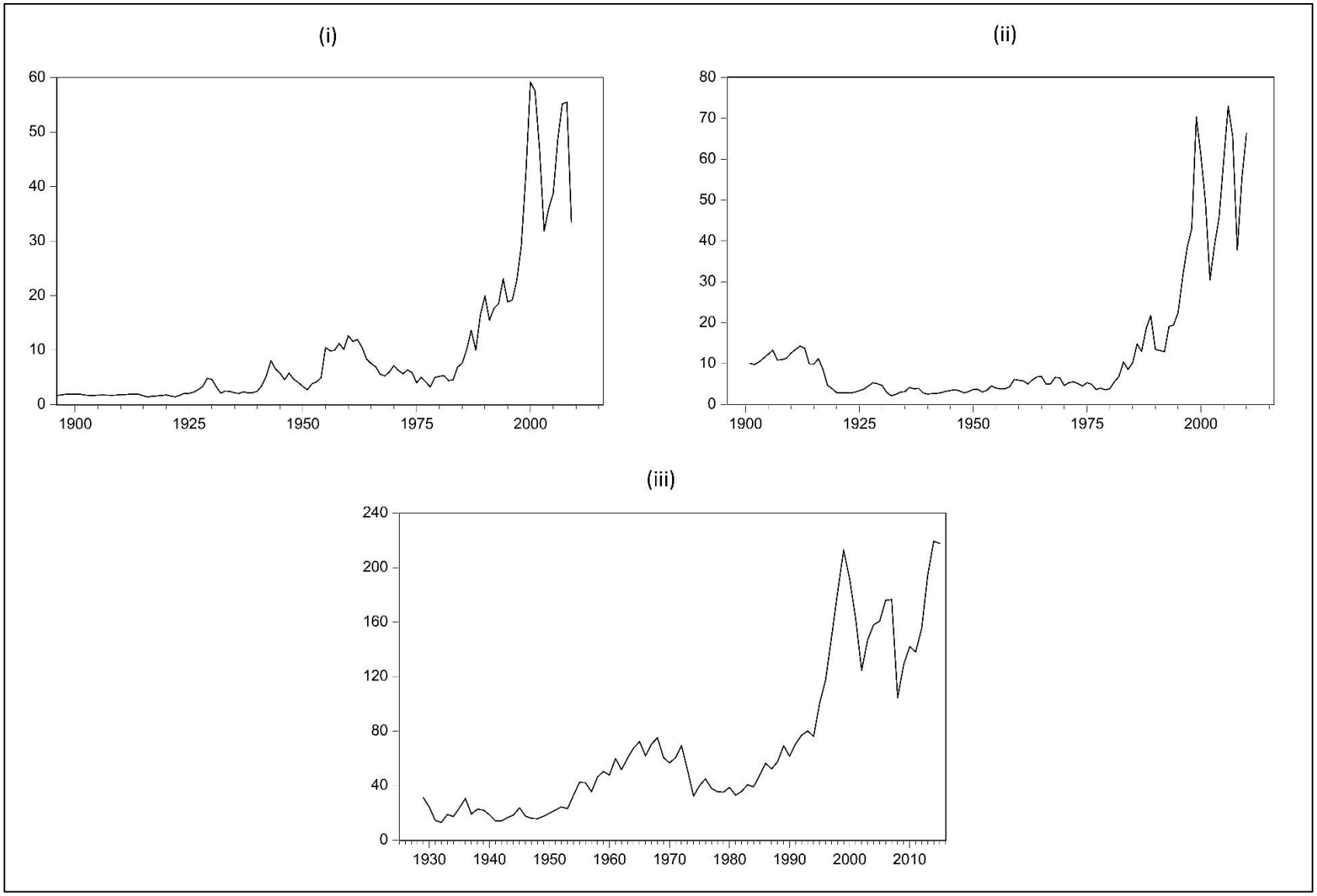

Figure 4: Real stock price indices in historical perspective

3. Theoretical perspectives on functional income distribution

The functional income distribution debate can be epitomized by the distinction between the neoclassical and the political economy approach, two substantially different methodological frameworks that attempt to explore the driving forces behind its shifts. On the one hand, the neoclassical paradigm targets, primarily, capital-augmenting technological change and, secondarily, the different impacts of trade globalisation on emerging and advanced economies, as the only parameters that can shift the, otherwise stable, factor income shares. On the other hand, the political economy approach centres on the inherent characteristics of free-market capitalism that lead to unequal distribution towards profits, stressing the roles of financialisation, trade globalisation, welfare expenditures, and unionisation (see Rodrik 1997; Stockhammer 2012; Bengtsson and Ryner 2015; Hein 2015), inspired mainly by Kalecki's (1951) pioneering analysis of functional income distribution as a function of the price mark-up. In general, the choice of factor income shares as dependent variables, represents the political economy class-based approach, expressing a specific social conflict relationship (Bengtsson and Ryner 2015). Classless inequality measures, such as the Gini coefficient or the Theil index, depict unequal distribution among individuals, i.e. they are theoretically more related to the concept of methodological individualism, which is central in neoclassical economics.

According to Stockhammer (2012, p. 121): "*Financialization is a term that summarizes a broad set of changes in the relationship between the 'financial' and the 'real' sector, which give greater weight to financial actors or motives*". The financialisation of the economy since the rise of neoliberalism during the early 1980s has several characteristics, such as (i) rising shareholder value orientation and short-termism of management (Lazonick and O'Sullivan 2000); (ii) rising tendency of dividend and interest payments (Stockhammer 2004); (iii) increasing salaries of the top management employees (Hein 2015); and (iv) steadily rising (household) indebtedness. As argued in the previous section, such developments existed during the late 19th and early 20th centuries as well, despite its distributional effects have not been studied yet, in terms of factor income shares.[9] With respect to income distribution, as shown in theoretical studies, rising indebtedness may have important distributional effects through its effect on firms' and/or workers' bargaining power. An early attempt to model (corporate) debt

[9] Roine et al. (2009) is the only study that uses annual historical macroeconomic data and estimates the distributional effects of financial development, finding that it increases the top income shares, based on panel data analysis.

and interest payments' distributional effects into a Kaleckian distribution model has been made by Hein (2007), who centres on the potential impact of interest rate variations on the price mark-up. Distinguishing between interest-elastic and interest-inelastic mark-ups, Hein claims that in the latter case there is no effect on real wages, i.e. income redistribution occurs only from firms to rentiers, due to debt service. Argitis and Dafermos (2013) argue that increases in corporate indebtedness make firms attempting to limit wage growth in order to improve their financial position, implying an elastic mark-up. In addition, they also embed households' indebtedness into the wage setting function contending that its effect on workers' bargaining power is negligible. On the one hand, it may lead to a more aggressive wage bargaining strategy in order to improve their financial position. On the other hand, high debt commitments make workers more insecure about defaulting on their debt, therefore they avoid endangering their employment by negotiating more aggressively for higher wages. Building on the latter scenario, i.e. the positive correlation between workers' indebtedness and financial insecurity, Kim *et al*. (2017) present a stock-flow-consistent (SFC) model in which they incorporate households' debt commitments into a cost of job loss function[10] and show that rising household indebtedness can lead to reductions in the wage share. Another aspect of financialisation that affects income distribution is shareholder value orientation, i.e. shareholders induce firms to be short-termist and focus on preserving the value of share prices in high levels by increasing their debt ratios or their dividend payout ratio (Lazonick and O'Sullivan 2000). Eventually, this process increases overhead costs, so firms attempt to cut costs by decreasing wages in order to improve their financial position. Overall, very few empirical studies attempt to clarify the relative distributional effects of financial variables, whilst none of them explores this phenomenon beyond the post-WWII era, i.e. before the 1960s, despite private debt accumulation has been extensive at least since the late 19th century, as shown in the previous section.

The distributional impact of trade globalisation is another controversial topic between neoclassical economists and those who follow the political economy approach. The neoclassical globalisation hypothesis is being derived from the well-known Stolper-Samuelson (1941) theorem, which predicts that trade openness will diminish global income inequalities, since it should decrease the wages in the advanced countries and increase them in the emerging

[10] Darcillon (2015) and Meyer (2017) provide econometric evidence that financial intermediation and the size of the financial sector decrease workers' bargaining power, employment protection, and the development unions' institutional structures, but they do not test their direct effects on inequality.

economies, i.e. the abundant factor will benefit in each case. The two very strong theoretical hypotheses behind this theorem are that all economies are in a stable full-employment state, and the mobilities of capital and labour must be equal to zero. Contrarily, authors within the political economy approach argue that this prediction is only partly true since trade openness weakens workers' bargaining position even in the emerging economies, as it benefits the more mobile factor, i.e. capital (Rodrik 1997). Stockhammer (2012) and Hein (2015) link trade (and financial) openness to increased exit options for the firms, which evidently empowers capital owners and weakens the working class, hence globalisation's effects are harmful to real wages regardless. Nevertheless, Palley (2018) stresses that the pre-WWII and post-WWII trade globalisation periods were very different qualitatively, as the former was motivated by trade gains, and not the domestic conflict over the determination of wages. Hence, trade openness may have benefited both factors of production in the pre-WWII era, instead of providing more exit options to firms.

The fall of the post-WWII welfare state and the decrease in the unionisation of workers are pointed out as another two major factors that led to the fall of the wage shares in the advanced economies since the early 1980s. This dimension has been thoroughly discussed within the field of political science, but also within the non-mainstream political economy approach (see Marglin and Schor 1992). Welfare expenditures, especially when they are related to labour market spending and upward redistribution of income, can increase the bargaining power of labour as they decrease the cost of job loss. Regarding unionisation, following Kalecki's (1954) monopoly pricing framework, strong trade unions can squeeze the price mark-up, thus shift distribution towards wages, increasing its share of the national income.

Last, the neoclassical argument about shifts in factor income shares is centred on the capital-augmenting nature of technology. Given a high elasticity of substitution between workers and machinery (Hicks 1932), technological advancements will affect the composition of production inputs, i.e. the demand for labour will fall as less labour input will be needed to produce the same amount of goods. In theory, technology may indeed decrease real wages if and only if the elasticity of substitution between the capital and labour is larger than one.

4. Determinants of functional income distribution: A review of the empirical literature

In recent years, and especially after the 2007-8 financial crisis, the interest in the determinants of the wage share has been growing substantially within the empirical literature. Based on the

theoretical arguments presented in the previous section, several scholars provide evidence for the underlying causes of shifts in factor income shares, beyond the purely technical neoclassical perspective.

Argitis and Pitelis (2001) provide evidence for industrial profit share's determinants in the USA and the UK (1963-97), testing for monetary policy effects. The use of industrial profit share aims to explore the intracapitalist distribution conflict dimension of financialisation. Their time series estimations results indicate that the nominal money lending interest rate has a strongly negative and statistically significant impact, which suggest that financialisation induces redistribution from productive sectors to rentiers. They also control for the money wage rate, unemployment, and strike intensity, yielding the expected signs. Later, Hein and Schöder (2011) develop a post-Kaleckian growth and distribution model and, subsequently, estimate functions for investment, savings, and the profit share. Following the general-to-specific ARDL methodology and using time series data for the US and Germany (1960-2007), they report robust results of strongly negative effects of changes in the real long-term interest rate on the profit share, given the debt-to-capital ratio, suggesting that their price mark-ups are interest-elastic.

By the same token, Dünhaupt (2017) estimates adjusted labour share's determinants using various specifications for a panel of 13 countries (1986–2007), focusing on globalization, shareholder value orientation, and government activity. The coefficients obtained by these estimations indicate robust negative effects for changes in trade openness, outward FDI, shareholder value, interest payments, and unemployment. In addition, she reports that government activity has a strongly positive -and robust- impact on distribution, as expected. Although, peculiarly, the effect of unionization appears to be negative and statistically significant –in contrast to what is expected from a Kaleckian perspective. The author attributes this issue to biases due to the short time dimension of the panel.

Another recent econometric study on the determinants of the wage share is Guschanski's and Onaran's (2018) paper, which uses sectoral level data for eight advanced OECD countries (1970–2011). Despite some notable cross-country differences, the findings show that technological change's impact is statistically insignificant, whilst the negative effects of globalisation, welfare state retrenchment, labour's diminishing bargaining power, and financialisation prevail. Not surprisingly, the negative effect of the household debt ratio is stronger in the most advanced countries of the sample, i.e. in the USA, the UK, and Germany.

The last study on the macro distributional effects of financialisation comes from the field of international political economy, conducted by Wood (2017). The inspiration of this

study is the Varieties of Residential Capitalism (VORC) approach, hence it focuses mainly on the effects of mortgage accumulation. The estimations utilize both time series and panel data analysis for a dataset which includes UK, US, Denmark, and Sweden (1979-2012). The financialisation variable used is the outstanding mortgage stock, controlling also for unemployment, the right-left index (RILE), and (non-)liberal welfare state regimes. The panel results show that mortgage stock's effect is negative and statistically significant. However, despite the estimators obtained in the cross-country time series estimations are negative as well, they are robust only for the US and the UK, underlining a potential linkage between household debt commitments and their wage negotiating power.

Alvarez (2015) focuses on the firm level and estimates the effects of the financial interest and financial profits on the real wages of 6980 French non-financial corporations, over the period 2004-2013. The econometric findings of the fixed-effects panel data models estimated, show that both financial variables decrease the wage share and their magnitude is stronger compared to the effects of the real variables included, such as trade openness and labour market institutions. Similar findings are reported by Köhler et al. (2018) utilising a panel dataset of 14 OECD countries over the period 1992-2014. The estimation results of this study provide robust evidence that non-financial corporations' financial payments and financial liberalisation decrease the labour share. The negative impact of trade globalisation is also consistent, but the impact of household debt is insignificant.

Stockhammer (2017) estimates private wage share's determinants for an unbalanced panel dataset of 71 countries from 1970 to 2007, giving prominence to the distinction between developing and advanced economies. The negative effect of financial globalisation seems to be the most crucial factor that has been contributing to the decline of wage shares. Also, this study shows that the impact of globalization and welfare state retrenchment is clearly negative and robust. The most interesting finding is that the negative globalisation effect holds clearly for the developing economies as well, which disproves the Stolper-Samuelson (1941) theorem.

Harrison's (2002) econometric study is the first paper that estimated the impact of globalisation on the labour share, utilizing a panel of over 100 countries (1960-1997). Her main findings indicate that the capital-labour substitution ratio and capital controls have a positive effect on the wage share, while globalisation's impact is negative. The effects of globalisation are being tested through trade openness, exchange rate crises and Foreign Direct Investment (FDI) inflows. The paper by Jayadev (2007) tests econometrically the relationship between capital mobility and functional income distribution using panel data methodology for a sample of up to 80 countries (1970-2001). His main robust findings are that capital accounts openness

and real interest rate decrease the labour share. However, it is noted that the coefficients vary notably when one distinguishes among low, middle, and high-income countries. The report published by the ILO (2011) estimates functional distribution's determinants for regional groups of developing countries, underlining that the bargaining power of labour has been undermined due to financialisation and trade openness.

One of the latest empirical contributions that scrutinise the trade globalisation – functional income distribution nexus is the study of Hung and Hammett (2016). The scope of this study is to assess globalisation's impact on the manufacturing labour share of the USA (1999-2009), from a mainstream perspective. The explanatory variables include changes in import penetration, changes in the export share, changes in the TFP growth rate, in the relative foreign employment, in the FDI outflows-to-GDP ratio, in unionization, and in capacity utilization. The authors argue that, overall, globalisation's effect is negative but ambiguous, since the estimators of import penetration and the FDI outflows-to-GDP ratio are negative, while the export share's and relative foreign employment's effects are positive. However, it should be noted that the negative effects of the former are consistently statistically significant in almost every specification.

Checchi and Garcia-Penalosa (2010) test the distributional effects of unemployment benefits, bargaining coordination, union density, and the minimum wage on the labour share and personal inequality, inspired by a mainstream labour market institutions story. The panel estimations utilise a dataset of 16 OECD countries (1960–2000). Regarding the labour share estimations, the signs of the coefficients of unionization and minimum wage vary substantially, while the effects of unemployment benefits are negative, but insignificant in the vast majority of the reported specifications. The impact of bargaining coordination is positive and statistically significant in all specifications, which in a 'neoclassical world' would result in high unemployment, as actual wages would rise over their optimal market-clearing level.

In one of the earliest wage share determinants studies, Cowling's and Molho's (1982) use inter-industry/cross-section time series analysis for the UK economy (1968 and 1973), in order to test empirically Kalecki's (1954) degree of monopoly hypotheses. The explanatory variables include the Herfindahl index of concentration, the five-firm concentration ratio, advertising spending as a percentage of sales, imports as a percentage of sales plus imports, unionization, working days lost due to strikes, and collective bargaining coverage. The reported findings show unambiguously negative concentration and advertising effects, and positive unionization effects (which are not statistically robust though).

Fichtenbaum (2009) inspired by the mixed empirical results on the impact of unionisation on the labour share, distinguishes between production workers and supervisory or CEO employees, arguing that the income of latter is irrelevant to changes in union membership. Using the US economy as a case study (1949-2006), he constructs three distinct labour share indicators by excluding or weighting the income of non-production workers over the value added, and estimates the effects of union density, finding that it indeed increases the wage share, as in Kalecki (1954).

Social scientists such as Kristal (2010), Hancke (2012), and Bengtsson (2014a) examine how unionisation, welfare state retrenchment, and political factors affect the labour share, using post-WWII panel datasets. While Kristal (2010) and Bengtsson (2014a) find robust positive coefficients for union density, Hancke (2012) finds insignificant effects on the wage share. Hancke argues that his results are due to the inflation-averse stance of independent conservative central bankers in advanced economies, who adjust aggressively monetary policy to the expected inflationary effect of rising wages. Thus, even strong unions take into account the uncertainty of such a potential monetary policy reaction, making them more reluctant in their negotiations for higher wages. Bengtsson (2014b) studies Sweden's manufacturing labour share (1900-2000) in historical context, using three-year averages specifications. His findings suggest that effects of union density are positive but insignificant (which he argues that is due to the small sample size, given the three-year average specification) and that the main statistically significant findings are the positive effect of government spending and the negative effect of inflation.

Last, Bentolila and Saint-Paul (2003) test empirically the neoclassical assumption on the distributional effects of technology, using a panel of 13 industries in 12 OECD countries (1972-93). The obtained results, according to the authors, support partially their capital-augmenting technology scheme (measured by TFP), but some big discrepancies do exist mainly due to the effect of workers' bargaining power, i.e. union density. Advancing, IMF's (2007) outlook report estimates the effects of globalisation, technical change, and labour market institutions on functional inequality, for a panel dataset of 18 OECD countries (1983-2002). The two technology variables are the ICT capital stock and the capital-labour substitution ratio, which according to the authors are the primary factors that explain the fall of the Labour shares. The second prominent study which conducts functional distribution econometric estimations in order to test the neoclassical technology story is EC's (2007) report. The estimations show that the capital-to-labour ratio has a positive effect, while the estimators of the ICT services per employee are not statistically robust, thus the results are inconclusive.

5. Specifications and Econometric methodology

As shown in the previous section, most empirical studies within the functional income distribution determinants literature utilise panel data analysis and focus on the post-1970's period. Hence, the motivation for this study is twofold. First, to examine distributional effects in historical perspective, especially regarding financialisation which as demonstrated in section 2 is not a novel post-WWII development. Second, to demonstrate that cross-country differences matter, hence time series analysis can reveal valuable information about domestic economies' structures, which otherwise remain overlooked. Thus, the estimations utilise annual historical macroeconomic data for France (1911-2010), Sweden (1891-2000), and the USA (1929-2015).[11] The estimations are based on the unrestricted Error-Correction Model (UECM) (see Sargan 1964, Davidson et al. 1978), i.e. both the short-run (first-differenced) and the long-run (level) effects of the independent variables are estimated. According to Pesaran and Shin (1999), this parametrisation of the standard ECM model can efficiently yield estimates of potential cointegrating (long-run) relationships, even among variables with different integration orders, i.e. I(0) and I(1). From an economic perspective and given the length of the historical time series used, our interest is focused on the long-run coefficients which depict the long-term equilibrium relationships among the variables, rather than on the short-run effects which reveal the speed and direction of adjustment towards the long-run equilibrium in response to temporary distortions. The econometric specification incorporates different arguments on the determination of the labour share, focusing on the effects of government spending, unionisation, and trade globalisation, but mainly on testing the impact of different measures for financialisation. Choosing two countries with weaker (France and the USA) and one with stronger trade union structures (Sweden) allows us to evaluate the argument of Argitis and Dafermos (2013) that the negative distributional effects of mortgage indebtedness are relatively more limited (or even perverse) in countries coordinated labour market institutions. Accordingly, the baseline specification is of the following form:

$$\Delta(WS_t) = \alpha_0 + \alpha_1 WS_{t-1} + \alpha_2 GCONS_{t-1} + \alpha_3 UD_{t-1} +$$

$$\alpha_4 OPEN_{t-1} + \alpha_5 MDEBT_{t-1} + \alpha_6 BDEBT_{t-1} + \sum_{n=0}^{N} \beta_n \Delta z + \varepsilon_t \qquad (1)$$

[11] Data sources and descriptive statistics for all variables can be found in Appendix A1 and A2.

where WS is the (adjusted) wage share, $GCONS$ is government consumption (% of GDP), UD is union density (% of labour force), $OPEN$ is trade openness (% of GDP), $MDEBT$ is the mortgage debt-to-income ratio (% of GDP), $BDEBT$ is the business debt-to-income ratio (% of GDP), and z is a vector that includes short-run (first-differenced) effects of variables. The terms a_0 and ε_t are the constant and the error term, respectively. $OPEN$ is defined as the sum of exports and imports divided by the level of output, while $GROWTH$ ($\Delta(GDP)$) is included among the short-run (first-differenced) effects in order to control for the counter-cyclicality of the labour share. Government spending is used as a proxy for welfare spending, which is assumed to decrease the cost of job loss and lead to more equal distribution through the provision of benefits, thus a positive impact on the labour share is anticipated ($\partial\Delta(WS)/\partial GCONS > 0$). For Sweden, as Esping-Andersen (1996) and Lundberg and Åmark (2001) argue that the experience of the extensive universal Swedish welfare state model is mainly a post-1970's development rather than a historical stylized fact. Thereby, its distributional effects in historical context may be moderate, compared to the rest countries where universal social insurance was established even in the pre-WWII period. Proceeding further, -following Kalecki's (1951) 'degree of monopoly' framework- unionisation is expected to empower workers against capital, hence its effect on the Labour's income share is expected to be positive, due to the decrease in the price mark-up ($\partial\Delta(WS)/\partial UD > 0$). It is anticipated that the positive impact in the cases of France and the USA will be less strong since their unions have weaker institutional positions compared to the Scandinavian countries, as collective bargaining is conducted mainly in the firm and individual level. Trade globalisation, $OPEN$, measures the enhanced international capital mobility, i.e. increased exit options for the firms, which ultimately translates to enhanced bargaining power for the most mobile factor, i.e. capital (Rodrik, 1997), thence a negative sign is expected ($\partial\Delta(WS)/\partial OPEN < 0$). Although, according to Palley's (2018) recent study on the characteristics of trade globalisation in historical perspective, the earlier phases of globalisation (pre-WWI and Golden Age) were driven by trade gains, hence they were indeed mutually beneficial for labour and capital in industrialised countries, despite they created macroeconomic imbalances. In contrast, the current neoliberal globalisation period is driven by the domestic distributional conflict between labour and capital, so it reflects more accurately increased exit options for capital. In this respect, the effects of trade globalisation in historical context are likely to be negligible. Mortgage (household) indebtedness impact on functional income distribution is negligible within the theoretical literature, as argued in the previous section. A negative effect would

indicate that workers' rising financial vulnerability leads to loss of bargaining power, since it increases their cost of job loss (Kim et al. 2017), thus, to rising income inequality ($\partial\Delta(WS)/\partial MDEBT < 0$). If the opposite holds, that would show that workers could attempt to actively improve their financial position by demanding higher wages (Argitis and Dafermos 2013). Regarding the business debt-to-income ratio ($BDEBT$), its statistical significance depends on the elasticity of the mark-up with respect to the debt payments (Hein 2007; Argitis and Dafermos 2013). The interest rate may also be related to households' financial vulnerability, since an increase in it will further worsen their financial position, thus a negative effect on real wages would suggest that the deterioration of bargaining power dominates, following the rationale of Argitis and Dafermos (2013).

The real short-term interest rate (INT) is included in specification (2) as an additional financial control variable which may be related to households' financial vulnerability and the elasticity of the mark-up. A rise in it increases both household and corporate debt payments, at the expense of workers' bargaining power, thus. As a further test, in specification (3) the adjusted wage share is replaced with the private wage share (WSP) as the dependent variable, following Stockhammer's (2017) formulation[12], to prevent potential endogeneity issues with government consumption, our proxy variable for welfare spending. In the fourth main specification, the real stock prices index (PS) is incorporated as a control variable to proxy shareholder value orientation, through asset price inflation. As argued earlier, this variable may not fully depict the effect of the shareholder value maximisation principle, as it also captures bubbles, hence it is included as an additional control, rather than in the baseline specification (1). Regarding robustness tests, the impact of capital augmenting technical change, in the form of Total Factor Productivity (TFP), is evaluated in specification (5). Following the neoclassical narrative, capital augmenting technology has negative effects on real wages, under the strong assumption of well-behaved production function and high elasticity of substitution between capital and labour, i.e. larger than one. In the robustness specification (6), average trade tariffs ($TARRIF$) replace trade openness, as an alternative measure for trade regulation, which is expected to have a positive effect on the wage share, as it limits capital mobility, thus exit options for firms. In specification (7), stock market capitalisation as a percentage of the GDP ($SCAP$) is included as an additional control variable which proxies financial deepening. Its

[12] As the government sector is, by definition, non-profitable, its wage share is one hundred per cent, thus the private wage share is calculated as: $WS = (1 - GCONS) * WSP + GCONS * WSG \Rightarrow WSP = (WS - GCONS)/(1 - GCONS)$, where WSG is the government sector wage share.

effect on the labour share is expected to be negative, as financial deepening depicts increased exit options for firms in the financial sector and the degree of shareholder value orientation, hence rising bargaining power for capital. Finally, in the last robustness check (spec. (8)) the short-run coefficients are in first lags (without contemporaneous coefficients) in order to evaluate potential simultaneity issues.[13]

6. Historical data sources and stylised facts

The compiled historical macroeconomic dataset of this study includes annual series from various sources, covering the periods 1911-2010 for France, 1891-2000 for Sweden, and 1929-2015 for the USA.[14] More precisely, the wage share for the USA, Sweden, France, come from BEA NIPAs, Edvinsson (2005), and Piketty and Zucman (2014), respectively. As shown in Figure 3 below, the early financialisation phase of the pre-WWII period in France and Sweden was characterised by a decline in the wage shares, as expected. From 1920 to 1950 a clear upward trend is observed for all three countries. In the Golden Age, i.e. between 1950 and 1975, the wage shares of France and the USA remain relatively stable, whilst during the same period, Sweden's labour share increases steadily. Eventually, as highlighted in most studies on the determinants of the labour share, in the neoliberal post-1980's period real wages reduce uniformly. It is worth noting that the decline is milder in the case of the USA, whereas the French labour share decreased dramatically from the late 1970s to the early 1990s but then remains relatively stagnant until today.

[13] As a further test to justify the choice of specification (1) as baseline, in Appendix A3 can be found estimation results with two lags for the short-run coefficients. Using these specifications as starting points and testing down based either on information criteria or on the R-squared values, the optimal specification is found to be the simplest form of ECM, i.e. the baseline specification (1).

[14] I am grateful to Erik Bengtsson for providing most historical series for Sweden, and for his advice on potential data sources for the other case studies.

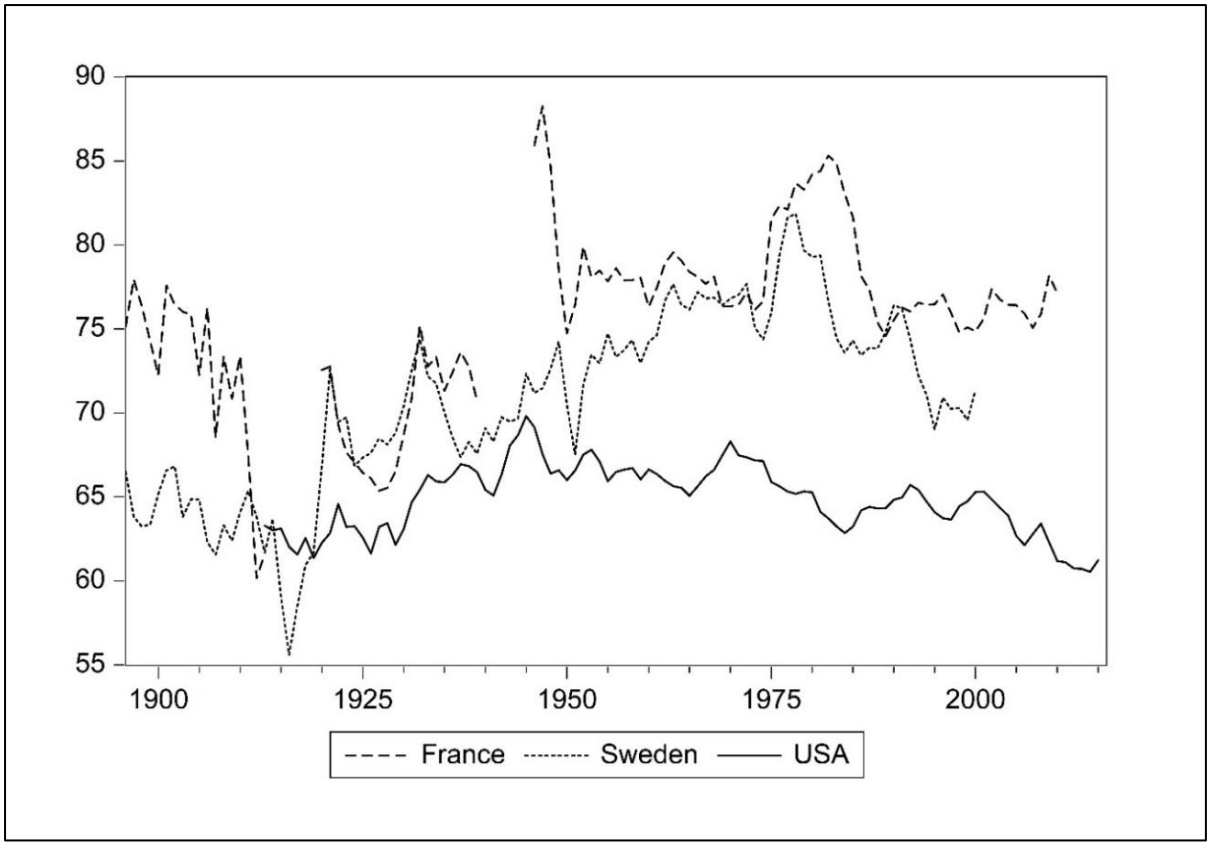

Figure 5: Labour share (%)

The mortgage debt ratio, the corporate (non-mortgage) debt ratio, and the real interest rate data for all countries are calculated using data from Jordà et al. (2017). Since historical corporate debt series are not available for our case studies, it is approximated by subtracting mortgage debt from total private debt (see Figure 1). The government consumption ratio comes from BEA NIPAs for the USA, from Jordà et al. (2017) for Sweden, and from Piketty and Zucman (2014) for France. As depicted in Figure 4, the share of the government sector expanded from less than 10% in 1929 to almost 25% in the early 1950s. After that point, government consumption reduces steadily until today reaching again approximately 10%. This observation is interesting since the share of the public sector declines even during the Golden Age, in which the US state is supposed to follow Keynesian-inspired expansionary policy. Contrasting the government spending series with those of the US labour share, indeed they seem to be strongly positively correlated, as expected. In France, the share of government spending was considerably low until WWII (below 5%), where it starts to expand rapidly. The initial steep increase probably has to do with armament expenditures during the war years, but the rise in government expenditure continues to rise at a steady rate until the 1980s. After the early 1980s, i.e. the neoliberal period, the spending share of the French public sector still grows, but, evidently, at a slower rate compared to the early post-WWII period. The variation in these

series seems to be positively correlated with the relevant labour share series since 1920, whilst for the earlier period, the steep decline of the French wage share does not seem to be correlated with the stagnant government consumption share. Regarding Sweden, its government sector share shows a slight upward trend between 1890 and WWII, where it begins to increase rapidly from around 15% to over 35% in the mid-1980's welfare retrenchment era. With respect to its correlation with the Swedish labour share, that seems to be quite strong over the period 1950-2000, but the two series seem to be delinked in the 1890-1950 era. It should be noted that the use of government spending as a proxy for welfare state expenditures has certain shortcomings since this indicator includes several other types of expenditures, such as public employment and pensions. In this regard, it could be argued our proxy is not ideal, but given the availability of historical macroeconomic data, government spending is the most reliable variable for that purpose. The fluctuations of the historical public spending series for Sweden are in line with the argument of Esping-Andersen (1996) who claims that the extensive welfare state is mainly a post-WWII development rather than a historical stylised fact. From a qualitative perspective, Lundberg and Åmark (2001) argue that despite the pre-WWII social spending in Sweden was higher compared to many countries, the population coverage of those expenditures was quite limited due to gender, age, and place discrimination. In spite of the lower share of public spending, such social security discrimination did not exist in the pre-WWII France, as a more universal social insurance system was established under the pressure of social groups like the feminist movement and agricultural workers, among others (Dutton 2002). In this respect, regarding income distribution, it is likely that government spending will be relatively more important in the case of France.

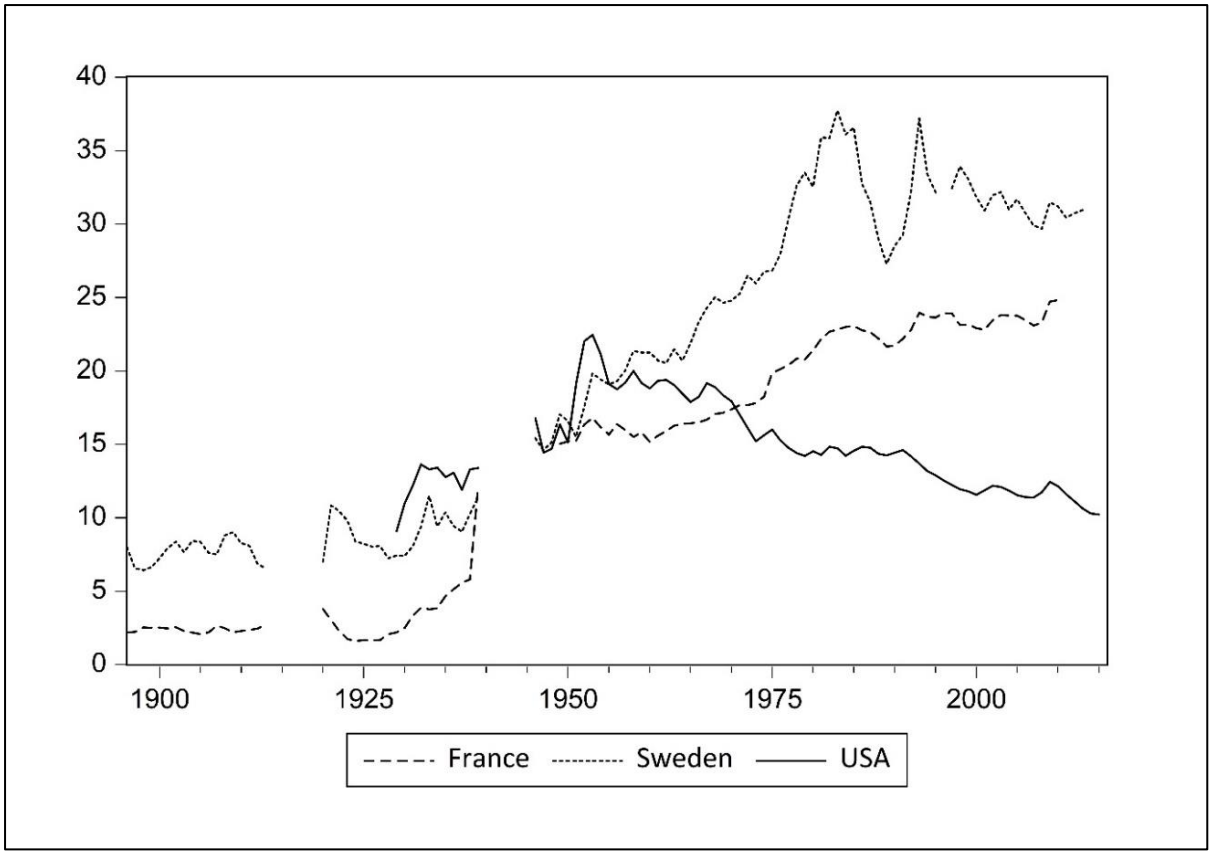

Figure 6: Government consumption (% of GDP)

The series for union density come from OECD and Donado and Wälde (2012). For France, the union density series have randomly missing values before 1960, thus the data are interpolated for this period using a log-linear approximation.[15] Figure 5 shows that unionisation rose significantly in France, Sweden, and the USA from the late 19th century to approximately 1950. For Sweden, the rate of increase was relatively higher and continued until the mid-1990s in which it reached its peak at over 80%. In France and the USA, a steep decline started at around 1950, with the downward trend persisting until today, reaching the levels of the early 20th century. Contrariwise, in Sweden the steady reduction in union membership begins much later, i.e. in the mid-1990s, decreasing to the levels of the late 1950s during the current period. In total, the rate of unionisation is substantially higher in Sweden in historical perspective, implying that its potential impact on the wage share should be stronger. Comparing the series with the relevant labour share series (see Figure 3), we observe that in the pre-WWII period where union density increased indeed the wage shares increased as well. In the Golden Age (1950-late 1970's), unionisation and the wage share increase together only in Sweden, while in France and the USA union membership declines, but the labour share relatively stable, with

[15] Imputing the randomly missing observations is necessary in that case, because, otherwise, the econometrics software used (EViews) limits automatically the total time dimension of the estimations to a significant extent.

a steep increase in France during the early 1980s. This could imply a structural change in wage setting negotiation procedure in France and the USA in the post-WWII period, which undermined the role of unions to some extent. In this regard, union density seems to be stronger correlated with real wages in Sweden in the full period, thus it is more likely to obtain statistically significant estimates with the expected signs.

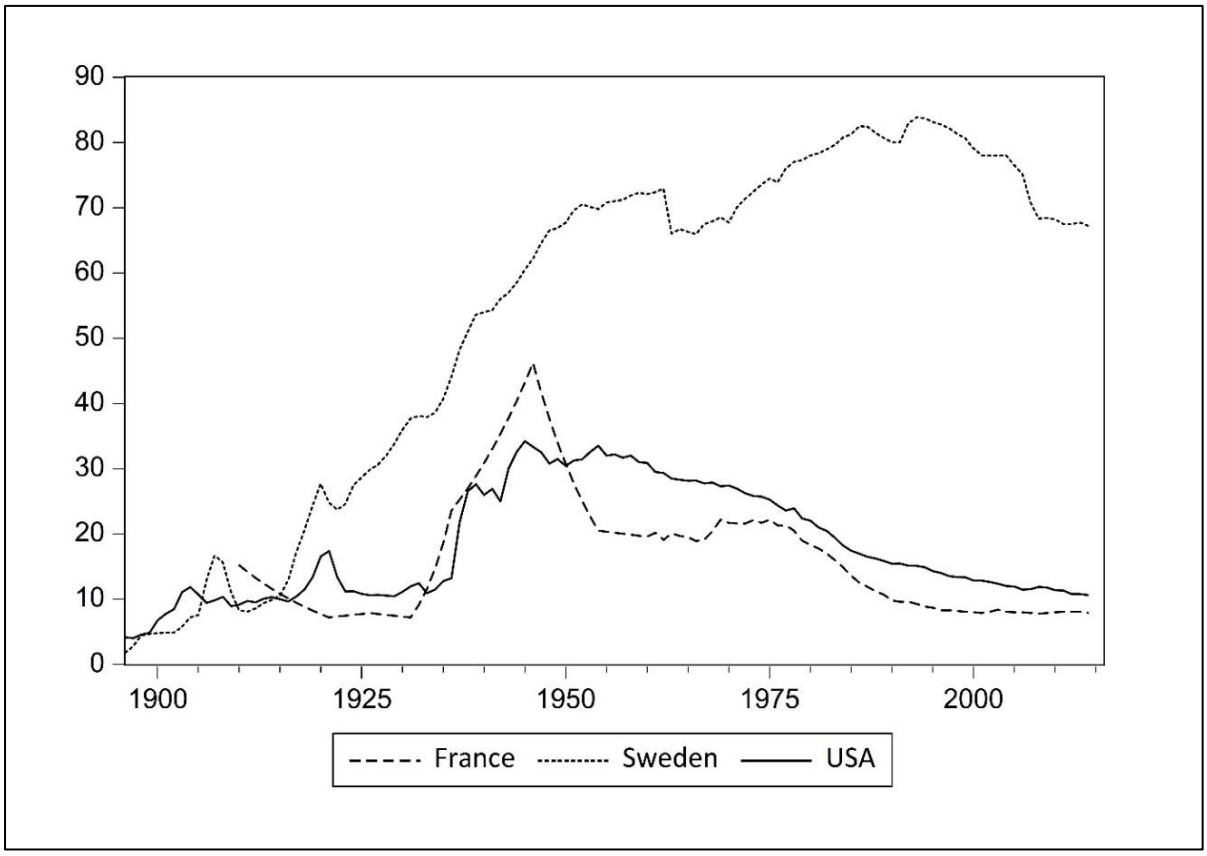

Figure 7: Union density (%)

The exports and imports series used for the calculation of trade openness are derived from BEA NIPAs for the USA, from Schön and Krantz (2015) for Sweden, and from Piketty and Zucman (2014) for France. As a different measure of trade openness, the average trade tariffs series come from Roine et al. (2009). Considering the first indicator, i.e. the share of the foreign sector (Figure 6), it seems that trade openness is a phenomenon that characterises mainly the post-WWII era, rather than the full period. More precisely, trade openness was quite restricted in Sweden and the USA until the mid-1970s, contrary to France where even in the late 19th century its level was above 20%. The series appear to synchronise after the mid-1970s, where trade openness rises rapidly for all countries, becoming almost double in size in France and Sweden, and approximately triples in the USA in which reaches over 30% of GDP. With respect to the fluctuations of the labour share series reported above, the two indicators appear to be negatively

correlated only during the late post-WWII era, i.e. after 1980, and not in historical context. The argument that trade globalisation is mainly a post-WWII phenomenon rather than a historical stylised fact also finds support in the average trade tariff series. Figure 7 shows that imposed tariffs were increased in the pre-WWII period (with a temporary steep fall in WWI), whilst they declined dramatically in the post-1945 period, which is also clearly reflected in the trade openness series for all three countries. As both proxies for trade do not seem to be highly correlated with labour shares in the full historical period but only in the post-1980 era, their potential effect on the wage share is ambiguous. Focusing on the qualitative aspect of trade globalisation, Palley (2018) argues that the pre-WWII globalisation period was rather driven by trade gains, which benefited both capital and labour. In contrast, the post-WWII trade globalisation trend which escalated in the neoliberal era was motivated by the conflict between capital and labour, which resulted in the capital seeking cheaper labour in foreign countries driving down wages in the global level, i.e. benefiting the most mobile rather the abundant factor of production (Rodrik, 1997). Consequently, given the long time dimension of this study, it is unlikely that trade globalisation exerted a robust negative effect on the labour share in historical perspective.

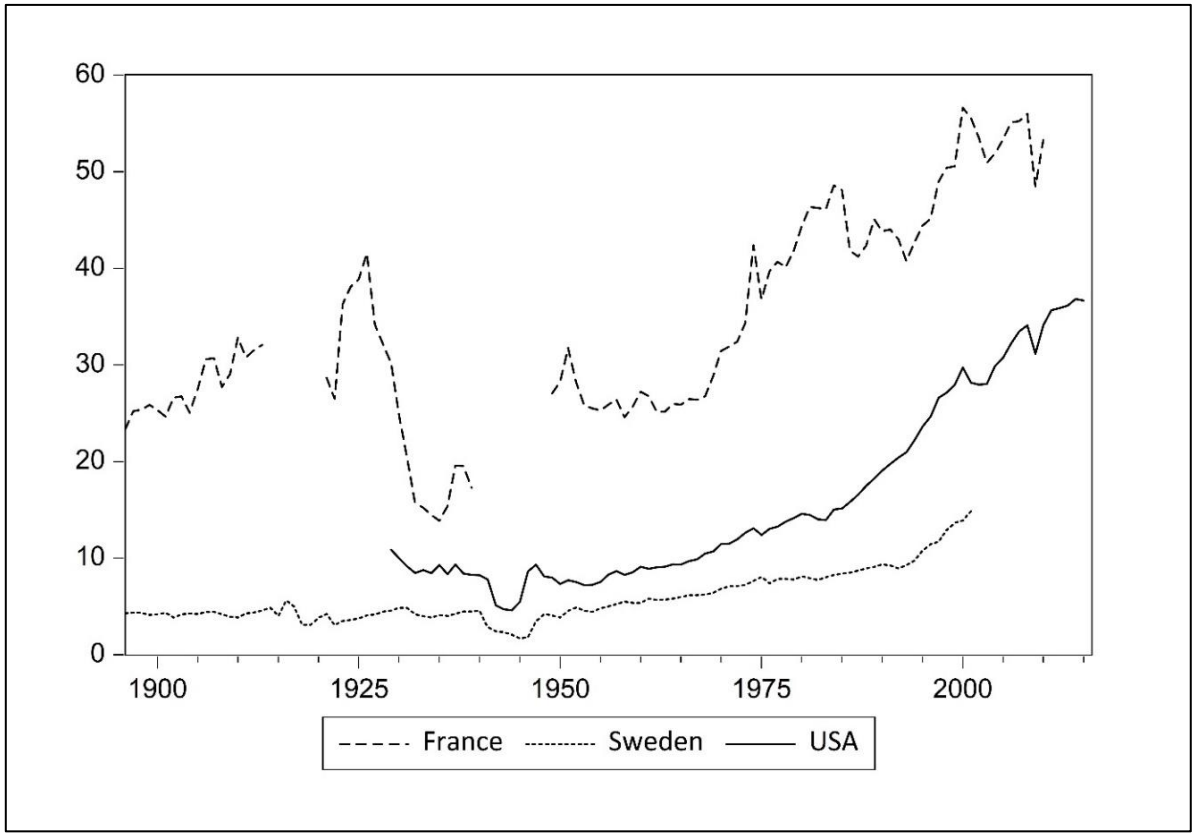

Figure 8: Trade openness (% of GDP)

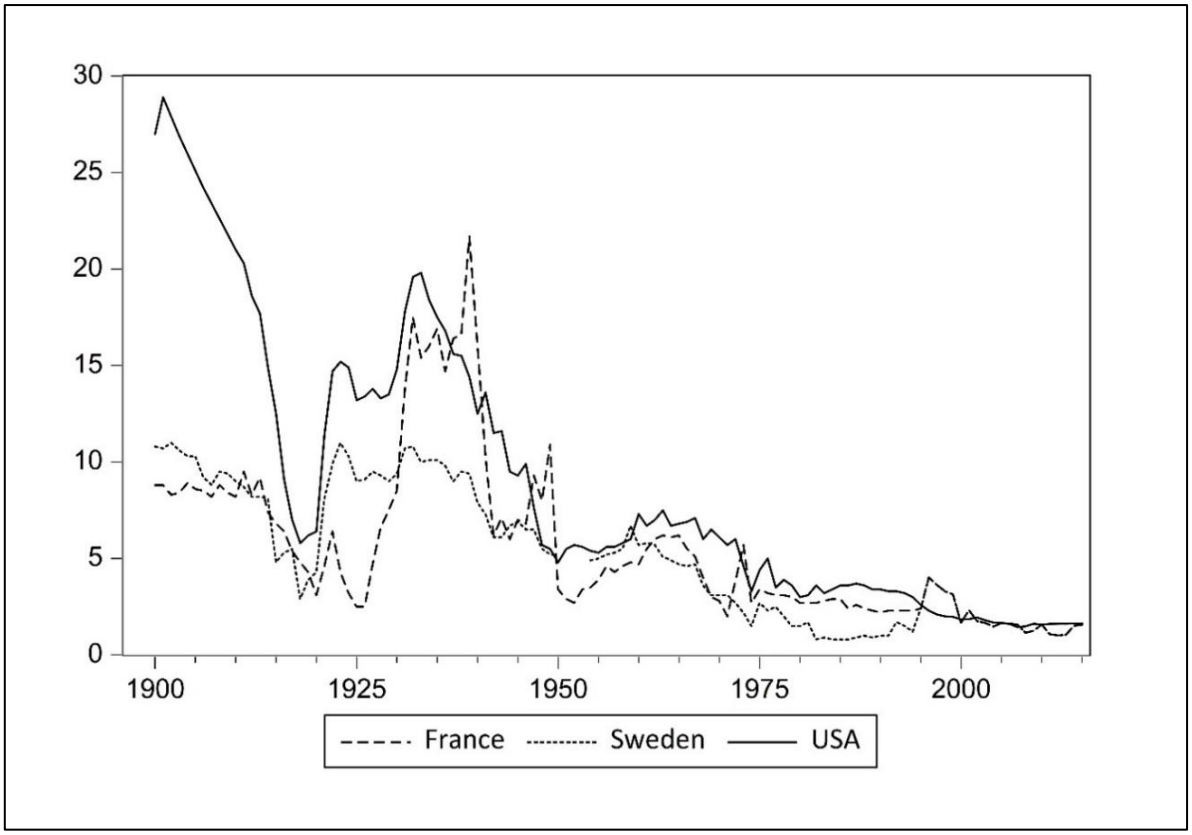

Figure 9: Average Trade Tariffs

Regarding the other control variables, the TFP (per hours worked) series come from Bergeaud et al. (2016). The real stock price indices are derived from Le Bris and Hautcoeur (2010), Shiller (2005), Waldenström (2014). Stock market capitalisation data come from Roine et al. (2009).

7. Econometric results

7.1France (1911-2010)

Starting with main results for France (Table 1), in specification (1) UD, $GCONS$, and $MDEBT$ have the expected long-run signs, with $GCONS$ and $MDEBT$ being statistically significant at the 1% levels. In specification (2), where INT is included in the baseline specification, $OPEN$, $GCONS$, $MDEBT$, and INT exhibit the expected signs in the long-term. Among the long-term effects $GCONS$ and $MDEBT$ are statistically significant, at the 1% and 10% levels, respectively. The rest variables are not statistically significant. In specification (3), where the wage share is replaced by the wage share of the private sector as the dependent variable, all long-term coefficients remain unchanged in terms of signs, statistical significance, and with minor variations in magnitude. More precisely, the expected signs of $MDEBT$ and $GCONS$ remain statistically significant at the 5% and 1% levels, respectively. With respect to $GCONS$,

this suggests that its positive impact on the wage share is not biased due to endogeneity. The addition of PS as a control variable for asset price inflation in order to proxy shareholder value orientation (spec. (4)), does not affect notably the long-run coefficients, as $OPEN$, $GCONS$, and $MDEBT$ have the expected signs. As in the baseline specification, the long-run effects of $GCONS$ and $MDEBT$ are statistically significant at the 1% and 5% levels respectively. The long-run coefficient of PS is statistically insignificant, showing that indeed shareholder value orientation has not been an important driver of the French wage share. Regarding the short-term effects, $GCONS$, $OPEN$, and UD have the expected signs, with $GCONS$ being statistically significant at the 1% level. According to the critical values of the Durbin-Watson (DW) and the Breusch-Godfrey (BG) tests, the null hypothesis of no serial correlation cannot be rejected in specifications (1), (3), and (4).

Overall, the baseline results for France indicate that the two major drivers of declines in the wage share are welfare expenditures and financialisation, in the form of mortgage indebtedness. With respect to the second finding, it seems that in France indeed rising household debt levels induce higher inequality, providing historical evidence for the argument of Argitis and Dafermos (2013) and Kim et al. (2017). The rest variables have insignificant long-term effects, despite UD and $OPEN$ exhibit the correct signs in some cases. The positive impact of welfare spending is also confirmed in the short-run coefficients as well, where the coefficient of $GCONS$ has the expected sign and is statistically significant in (1), (2), and (3). The strong welfare spending effects were anticipated given the universal character of the French social security model even in the pre-WWII period (Dutton, 2002).

Table 1: France (1911-2010) - Main results

	(1)		(2)		(3)		(4)	
	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*
Long-run effects								
WS(-1)	-0.278***	*-3.627*	-0.254***	*-3.144*			-0.274***	*-2.945*
WSP(-1)					-0.243***	*-3.526*		
UD(-1)	0.011	*0.131*	-0.067	*-0.702*	0.030	*0.320*	-0.012	*-0.131*
OPEN(-1)	0.011	*0.257*	-0.051	*-0.940*	0.023	*0.482*	-0.010	*-0.175*
GCONS(-1)	0.318***	*3.851*	0.336***	*3.920*	0.231***	*2.778*	0.317***	*3.041*
MDEBT(-1)	-0.155***	*-2.558*	-0.117*	*-1.809*	-0.161**	*-2.381*	-0.149**	*-2.385*
BDEBT(-1)	0.018	*1.020*	0.017	*0.921*	0.018	*0.892*	0.020	*0.935*
INT(-1)			-0.095	*-1.577*				
PS(-1)							0.004	*0.139*
C	16.815	*3.277*	17.534	*3.349*	13.865	*2.947*	17.370	*2.971*
Short-run effects								
Δ(WS(-1))	0.157	*1.301*	0.134	*1.090*			0.161	*1.218*
Δ(WSP(-1))					0.129	*1.079*		
Δ(GROWTH)	-0.009	*-0.795*	-0.008	*-0.616*	-0.009	*-0.747*	-0.008	*-0.655*
Δ(UD)	0.112	*0.373*	0.022	*0.072*	0.145	*0.429*	0.032	*0.079*
Δ(OPEN)	-0.085	*-1.515*	-0.035	*-0.426*	-0.097	*-1.538*	-0.024	*-0.299*
Δ(GCONS)	1.530***	*3.327*	1.848***	*3.554*	1.689***	*3.403*	2.189***	*3.913*
Δ(MDEBT)	0.164	*0.695*	0.097	*0.393*	0.145	*0.548*	0.023	*0.091*
Δ(BDEBT)	-0.037	*-1.000*	-0.032	*-0.847*	-0.043	*-1.055*	-0.019	*-0.500*
Δ(INT)			0.069	*1.387*				
Δ(PS)							0.017	*0.372*
R^2	0.48		0.50		0.44		0.49	
DW	1.53		1.58		1.57		1.57	
BG	0.10		0.00		0.14		0.13	

Notes: In (1), (2), and (4) the dependent variable is the adjusted wage share, while in (3) it is the adjusted wage share of the private sector (calculated as in Stockhammer (2017)), both in first differences. Statistical significance at 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

To evaluate the robustness of the main findings, an additional round of four specifications is estimated, interchanging control variables in the baseline specification (1). In specification (5) where the effect of TFP is added, the negative effect of $MDEBT$ (statistically significant at the 10% level) and the positive effect of $GCONS$ (statistically significant at the 1% level) are the only statistically significant long-term coefficients. The coefficient of TFP itself is statistically insignificant in the short- and the long-term, providing no evidence for the neoclassical technical change narrative. In specification (6) where $OPEN$ is replaced by $TARIFF$, once again, the only statistically significant long-term coefficients are those of $GCONS$ and $MDEBT$ (at the 1% and 5% levels, respectively), both having the expected signs. Adding $SCAP$ as an additional control variable for financialisation in specification (7) affects

significantly the long-term coefficients for France, as only the coefficients of UD and $MDEBT$ have the expected signs, but none of them is statistically significant. The long-run effect of $SCAP$ itself is positive rather than negative and statistically insignificant, contrary to what is expected. Nevertheless, the short-run coefficient of $GCONS$ has the correct positive sign and is statistically significant at the 1% level. Lastly, replacing the contemporaneous short-run effects with their first lags also influences the long-run coefficients, since now UD, $OPEN$, and $GCONS$ do have the expected signs, but again none of them is statistically significant. To sum up, the robustness specification (5) and (6) confirm that financialisation is the main driver of the wage share in France, and that welfare spending also plays a key role. In specifications (7) and (8) the results change notably, becoming inconclusive as all long-term coefficients become insignificant. A possible explanation for those findings in specification (7) is that the shorter length of the $SCAP$ series (1930-2005) creates biases as the sample size decreases significantly, thus the estimates are not considered to be as reliable as the main results.

Table 2: France (1911-2010) - Robustness tests

	(5)		(6)		(7)		(8)	
	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*
Long-run effects								
WS(-1)	-0.309***	*-3.712*	-0.253***	*-3.194*	-0.158**	*-2.049*	-0.216***	*-2.527*
UD(-1)	-0.047	*-0.427*	-0.001	*-0.008*	0.101	*1.478*	0.092	*0.967*
OPEN(-1)	0.030	*0.613*			0.050	*0.998*	-0.008	*-0.159*
GCONS(-1)	0.441***	*2.751*	0.288***	*3.381*	-0.069	*-0.755*	0.043	*0.426*
MDEBT(-1)	-0.130*	*-1.760*	-0.134**	*-2.313*	-0.011	*-0.209*	0.027	*0.389*
BDEBT(-1)	0.029	*1.493*	0.018	*0.958*	0.001	*0.094*	0.000	*-0.025*
TFP(-1)	-0.429	*-0.818*						
TARIFF(-1)			-0.010	*-0.093*				
SCAP(-1)					0.012	*1.008*		
C	19.341	*3.362*	15.612	*3.095*	9.948	*2.027*	14.348	*2.462*
Short-run effects								
Δ(WS(-1))	0.190	*1.544*	0.143	*1.188*	-0.100	*-0.877*	0.463***	*3.416*
Δ(GROWTH)	-0.006	*-0.538*	-0.010	*-0.895*	-0.004	*-0.375*		
Δ(GROWTH(-1))							-0.009	*-0.730*
Δ(UD)	0.163	*0.517*	0.058	*0.191*	0.060	*0.206*		
Δ(UD(-1))							-0.005	*-0.016*
Δ(OPEN)	-0.063	*-1.081*			-0.041	*-0.587*		
Δ(OPEN(-1))							0.120	*1.391*
Δ(GCONS)	1.342***	*2.775*	1.519***	*3.339*	1.750***	*4.288*		
Δ(GCONS(-1))							-0.418	*-0.701*
Δ(MDEBT)	0.117	*0.491*	0.149	*0.640*	-0.306	*-1.549*		
Δ(MDEBT(-1))							-0.095	*-0.362*
Δ(BDEBT)	-0.041	*-1.114*	-0.018	*-0.518*	-0.029	*-0.924*		
Δ(BDEBT(-1))							-0.008	*-0.191*
Δ(TFP)	-2.157	*-1.213*						
Δ(TARIFF)			0.291	*1.481*				
Δ(SCAP)					0.001	*0.069*		
R^2	0.50		0.48		0.65		0.25	
DW	1.58		1.54		2.17		2.25	
BG	0.04		0.01		0.23		0.00	

Notes: The dependent variable is the adjusted wage share in first differences. Statistical significance at 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

7.2 Sweden (1891-2000)

For Sweden, in specification (1) the long-term coefficients of UD, $MDEBT$, $BDEBT$. Among those coefficients, the negative sign of $MDEBT$ and the positive sign of UD are statistically significant at the 5% and 1% levels, as expected. Similar results are obtained in specification (2), where INT is included, in terms of signs and statistical significance as well. Again, UD increases the wage share and $MDEBT$ decreases the wage share, being statistically significant at the 1% and the 5% levels, respectively. The long-term coefficient of INT itself has the

expected sign, but it is not statistically significant. In specification (3) the two long-term coefficients that have the expected signs are UD and $MDEBT$, are the only statistically significant ones, at the 1% and 5% levels, respectively. The long-term coefficient of BDEBT also has the correct negative sign, but it is statistically insignificant. In total, the results of specification (1) are indeed robust to the private sector wage share as well. In specification (4), the effects of UD, $MDEBT$, $BDEBT$ exhibit the expected signs in the long-run, while the rest two coefficients have perverse signs. As in specification (1), the positive coefficient of UD and the coefficient of $MDEBT$ are statistically significant at the 1% and 5% levels, respectively. In addition, the control variable PS has the expected negative sign, but it is not statistically significant. However, here, the perverse coefficients of trade globalisation ($OPEN$) and $GCONS$ are also statistically significant at the 10% and 5% levels.

In Sweden, the two key variables for functional income distribution are union density and mortgage debt. The negative impact of mortgage indebtedness on the wage share is consistently robust, as minor variation is observed in terms of magnitude and statistical significance, confirming the theoretical argument of Argitis and Dafermos (2013) and Kim et al. (2017). As in France, rising household indebtedness reduces real wages in Sweden as well. Additionally, labour's bargaining power, measured by union density, decreases the mark-up, as Kalecki (1954) assumes, leading to higher real wages. The real short-term interest rate (INT) has the expected long-run sign as well, but it is statistically insignificant, therefore no safe conclusion can be drawn for the interest-elasticity of price mark-ups in Sweden. It is also worth mentioning that the long-term coefficients of trade openness (OPEN) also exhibit perverse signs in all four specifications, implying that for Sweden globalisation has not benefited the most mobile production factor, i.e. capital (see Rodrik 1997), which could be compatible with the story of Palley (2018) that the pre-WWII globalisation period was driven by trade gains and not class conflict. Regarding statistical issues, in specifications (1), (2), (3), and (4) the values of the DW statistic remains within the acceptable bounds of 1.5 to 2.5, hence serial correlation can be rejected. By the same token, the null hypothesis of no serial correlation cannot be rejected according to the BG test in all four main specifications.

Table 3: Sweden (1891-2000) - Main results

	(1)		(2)		(3)		(4)	
	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*
Long-run effects								
WS(-1)	-0.164***	*-2.316*	-0.144*	*-1.957*			-0.224***	*-2.966*
WSP(-1)					-0.175**	*-2.474*		
UD(-1)	0.039***	*2.679*	0.037**	*2.565*	0.043***	*2.755*	0.051***	*2.706*
OPEN(-1)	0.334*	*1.760*	0.333*	*1.757*	0.376*	*1.854*	1.025***	*3.019*
GCONS(-1)	-0.070	*-1.107*	-0.076	*-1.186*	-0.081	*-1.245*	-0.153**	*-2.198*
MDEBT(-1)	-0.057**	*-2.444*	-0.054**	*-2.326*	-0.061**	*-2.411*	-0.080***	*-3.361*
BDEBT(-1)	-0.014	*-0.794*	-0.012	*-0.653*	-0.017	*-0.880*	-0.008	*-0.384*
INT(-1)			-0.001	*-0.017*				
PS(-1)							-0.955**	*-2.143*
C	11.400	*2.293*	10.046	*1.944*	11.688	*2.435*	13.814	*2.690*
Short-run effects								
Δ(WS(-1))	0.005	*0.047*	-0.030	*-0.275*			-0.012	*-0.111*
Δ(WSP(-1))					0.036	*0.320*		
Δ(GROWTH)	0.000	*-1.166*	-0.001	*-1.542*	0.000	*-1.106*	0.000	*-0.669*
Δ(UD)	-0.156	*-1.541*	-0.139	*-1.377*	-0.143	*-1.309*	-0.176*	*-1.743*
Δ(OPEN)	-0.958**	*-2.263*	-0.866**	*-2.022*	-1.031**	*-2.227*	-0.513	*-1.102*
Δ(GCONS)	0.223*	*1.849*	0.183	*1.482*	0.208*	*1.603*	0.151	*1.250*
Δ(MDEBT)	0.217***	*2.789*	0.194**	*2.342*	0.233***	*2.760*	0.248***	*3.181*
Δ(BDEBT)	0.058	*1.072*	0.035	*0.656*	0.052	*0.885*	0.048	*0.902*
Δ(INT)			0.078*	*1.889*				
Δ(PS)							-1.484***	*-3.117*
R^2	0.47		0.50		0.46		0.56	
DW	1.77		1.94		1.81		1.86	
BG	0.67		0.68		0.75		0.80	

Notes: In (1), (2), and (4) the dependent variable is the adjusted wage share, while in (3) it is the adjusted wage share of the private sector (calculated as in Stockhammer (2017)), both in first differences. Statistical significance at 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

As in France, the robustness tests for Sweden also confirm the robustness of the baseline findings. In specification (5), the addition of TFP affects the long-run effects, to some extent, as now $MDEBT$, and $BDEBT$ have the expected signs, which are statistically significant at the 1% and 5% levels, respectively. Capital-augmenting technology's long-term impact, measured by the TFP, has a positive and statistically significant sign, in contrast with the neoclassical story. In this specification, the negative long-term coefficient of $GCONS$ becomes statistically significant, suggesting that government spending exacerbated rather than decreased income inequality, probably driven by the discriminatory character of the Swedish social spending model in the pre-WWII period (Lundberg and Åmark 2001). The results of specification (6) where $TARIFF$ replaces $OPEN$, does not affect significantly the baseline findings. The negative long-run effect of $MDEBT$ and the positive long-run impact of UD are the only

statistically significant coefficients, both at the 5% level. The effect of $BDEBT$ again has the correct negative sign, but it is statistically insignificant. In specification (7), adding $SCAP$ in the baseline specification (1) provides interesting results as the robustness of the negative impact of financialisation is underlined. More specifically, both long-term coefficients of $MDEBT$ and $SCAP$ do have the expected negative signs and are statistically significant at the 1% level, showing that household indebtedness and shareholder value maximisation have been decreasing Swedish workers' bargaining power, hence their income share. However, the long-term effects of $OPEN$ and $GCONS$ are statistically significant at the 1% and 5% levels respectively, but with perverse signs, which underline the importance of the qualitative differences of the pre-WWII trade globalisation period and the country-specific characteristics of the early non-universal Swedish welfare state model. Last, in specification (8) the long-term effects of $MDEBT$, $BDEBT$, and UD have the expected signs. Among those, the negative coefficients of $MDEBT$ remains statistically significant at the 1% level, and UD at the 5% level. As in specification (7), the long-term coefficients of $OPEN$ and $GCONS$ have perverse signs and are statistically significant at the 5% and 10% levels, respectively. Overall, the robustness check specifications, suggest that the baseline findings for Sweden are robust, since the effects of $MDEBT$, $OPEN$, and UD hold consistently. It is worth noting that $SCAP$ also exhibits the correct sign, providing additional evidence for the negative impact of financialisation on labour's income share, in line with the arguments of the political economy approach on shareholder value maximisation (Lazonick and O'Sullivan, 2000). The role of technology also seems to play a role for Sweden, to some extent, as it is statistically significant, but since its effects changes signs between the short- and the long-term, it remains negligible.

Table 4: Sweden (1891-2000) - Robustness tests

	(5)		(6)		(7)		(8)	
	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*
Long-run effects								
WS(-1)	-0.227***	*-3.271*	-0.190***	*-2.715*	-0.356***	*-3.467*	-0.077	*-1.042*
UD(-1)	0.011	*0.637*	0.052**	*2.309*	0.004	*0.114*	0.041**	*2.460*
OPEN(-1)	0.003	*0.013*			1.579***	*4.224*	0.555**	*2.312*
GCONS(-1)	-0.194***	*-2.802*	-0.076	*-1.155*	-0.217**	*-2.265*	-0.116*	*-1.696*
MDEBT(-1)	-0.079***	*-3.461*	-0.041**	*-2.023*	-0.081***	*-3.114*	-0.078***	*-2.818*
BDEBT(-1)	-0.029*	*-1.697*	-0.002	*-0.106*	0.002	*0.074*	-0.004	*-0.228*
TFP(-1)	1.220***	*2.780*						
TARIFF(-1)			-0.117	*-0.857*				
SCAP(-1)					-0.085***	*-3.826*		
C	17.482	*3.487*	14.392	*2.972*	26.130	*3.335*	5.114	*0.981*
Short-run effects								
Δ(WS(-1))	0.016	*0.155*	-0.067	*-0.540*	0.038	*0.275*	0.133	*1.079*
Δ(GROWTH)	0.000	*0.218*	-0.001	*-1.241*	0.000	*0.723*		
Δ(GROWTH(-1))							-0.001	*-1.502*
Δ(UD)	-0.216**	*-2.277*	-0.135	*-1.274*	-0.287**	*-2.199*		
Δ(UD(-1))							0.061	*0.536*
Δ(OPEN)	-0.738*	*-1.807*			-0.325	*-0.458*		
Δ(OPEN(-1))							-0.629	*-1.187*
Δ(GCONS)	0.087	*0.749*	0.216*	*1.693*	0.032	*0.255*		
Δ(GCONS(-1))							-0.347**	*-2.579*
Δ(MDEBT)	0.196***	*2.714*	0.221***	*2.647*	0.250***	*2.893*		
Δ(MDEBT(-1))							-0.066	*-0.724*
Δ(BDEBT)	0.022	*0.421*	0.101*	*1.797*	-0.030	*-0.497*		
Δ(BDEBT(-1))							0.003	*0.054*
Δ(TFP)	-5.300***	*-2.957*						
Δ(TARIFF)			0.219	*0.920*				
Δ(SCAP)					-0.081	*-1.462*		
R^2	0.57		0.46		0.60		0.33	
DW	1.83		1.70		2.38		2.12	
BG	0.01		0.55		0.01		0.08	

Notes: The dependent variable is the adjusted wage share in first differences. Statistical significance at 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

7.3 USA (1929-2015)

Regarding the last case study, the USA, in specification (1) the long-term effects of $GCONS$ and $MDEBT$ have the expected signs and are statistically significant at the 1% level. In contrast, the long-term coefficient of $BDEBT$ has a perverse sign, i.e. positive, and is statistically significant at the 1% level, as well. Identical results in terms of statistical significance and magnitude are obtained in specification (2), where INT is included. The interest rate itself is not statistically significant and has a weak perverse long-term effect. Using the wage share of

the private sector as the dependent variable (spec. (3)) does not affect the long-term coefficients. The expected sign of $MDEBT$ remains statistically significant at the 5% level, whereas the perverse sign of $BDEBT$ is statistically significant at the 1% level. Similar findings with the baseline specification are obtained in specification (4) as well, in terms of signs, magnitude, and robustness of coefficients. The only notable difference is that the negative wage share effect of $OPEN$ is statistically significant at the 10% level. Regarding the post-estimation diagnostics, the values of the DW test are between 1.88 and 1.96 for the four specifications, i.e. within the 1.5-2.5 bounds, suggesting the absence of serial correlation problems. The results of the BG test also suggest that the null hypothesis of no serial correlation cannot be rejected.

Table 5: USA (1929-2015) - Main results

	(1)		(2)		(3)		(4)	
	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*
Long-run effects								
WS(-1)	-0.193***	*-3.346*	-0.202***	*-2.913*			-0.254***	*-4.514*
WSP(-1)					-0.168***	*-2.625*		
UD(-1)	0.001	*0.038*	0.007	*0.359*	-0.019	*-0.730*	-0.004	*-0.252*
OPEN(-1)	0.004	*0.226*	0.015	*0.648*	0.014	*0.599*	-0.049*	*-1.968*
GCONS(-1)	0.035**	*2.609*	0.035**	*2.474*	0.020	*0.316*	0.037**	*2.932*
MDEBT(-1)	-0.054**	*-3.200*	-0.061***	*-3.244*	-0.069***	*-3.264*	-0.051***	*-3.169*
BDEBT(-1)	0.071***	*2.743*	0.078***	*2.729*	0.086***	*2.790*	0.063**	*2.623*
INT(-1)			0.004	*0.161*				
PS(-1)							0.001***	*3.216*
C	11.952	*3.097*	12.297	*2.723*	9.874	*2.225*	16.382	*4.321*
Short-run effects								
Δ(WS(-1))	0.241**	*2.350*	0.250**	*2.223*			0.178*	*1.834*
Δ(WSP(-1))					0.182	*1.627*		
Δ(GROWTH)	-0.001***	*-4.070*	-0.001***	*-3.810*	-0.001***	*-2.919*	-0.001***	*-3.817*
Δ(UD)	0.029	*0.716*	0.025	*0.596*	0.073	*1.310*	0.031	*0.740*
Δ(OPEN)	0.315***	*4.053*	0.300***	*3.508*	0.336***	*3.661*	0.233***	*3.039*
Δ(GCONS)	0.059***	*2.733*	0.057**	*2.382*	-0.258***	*-3.105*	0.073***	*3.815*
Δ(MDEBT)	0.047	*1.321*	0.030	*0.772*	0.058	*1.378*	-0.023	*-0.645*
Δ(BDEBT)	-0.091	*-1.614*	-0.096	*-1.642*	-0.111	*-1.634*	-0.049	*-0.974*
Δ(INT)			0.010	*0.534*				
Δ(PS)							0.000	*-0.861*
R^2	0.65		0.66		0.53		0.71	
DW	1.92		1.90		1.92		1.90	
BG	0.32		0.20		0.41		0.11	

Notes: In (1), (2), and (4) the dependent variable is the adjusted wage share, while in (3) it is the adjusted wage share of the private sector (calculated as in Stockhammer (2017)), both in first differences. Statistical significance at 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

As in the main estimations, the results of the robustness estimations for the USA are mixed, with respect to what is expected in theory. In specification (5), where TFP is added, the expected positive long-run effect of $GCONS$ is statistically significant at the 5% level. TFP itself is not statistically significant, thus the neoclassical technical progress story is found to be irrelevant for the USA. Again, in specification (6) the signs, magnitude, and robustness of the coefficients remain unchanged. In specification (7) which includes SCAP as a control variable, the long-term signs remain similar to the baseline specification. Although, only $MDEBT$ and $BDEBT$ are statistically significant at the 5% level, and the long-run effect of $SCAP$ is positive and statistically significant. Those results make the impact of financialisation on the US wage share even more unclear, rather than clarifying it. Ultimately, in specification (8) all long-run coefficients remain similar, i.e. $MDEBT$, $GCONS$, and $OPEN$ exhibit the correct signs. Yet, the only statistically significant coefficient is the perverse negative long-term effect of UD. Summarising the main findings, financialisation and welfare spending are the main drivers of the labour share of the USA since 1929. While the robust positive impact of welfare spending is clear, the results are less straightforward for financialisation, as mortgage indebtedness decrease the labour share as expected, but business debt increases it. Therefore, the only way to clarify the overall impact of financialisation is to calculate the standardised coefficients for the regression, to make the relative effects comparable. Furthermore, the impact of trade globalisation is sensitive to the inclusion of certain financial variables, i.e. it exhibits the expected sign and is statistically significant only when PS is included (spec. (4)). On top of that, it should be noted that the effect of government consumption has the expected positive sign and is robust in the short-term as well. The impact of unionisation is negligible as it changes signs and it is statistically insignificant. As in France and Sweden, the estimations for the USA are free of serial correlation, according to the critical values of the DW statistic.

Table 6: USA (1929-2015) - Robustness tests

	(5)		(6)		(7)		(8)	
	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*
Long-run effects								
WS(-1)	-0.209***	*-3.377*	-0.162**	*-2.356*	-0.204***	*-2.942*	-0.136*	*-1.984*
UD(-1)	0.004	*0.217*	-0.014	*-0.831*	-0.007	*-0.252*	-0.038*	*-1.896*
OPEN(-1)	0.007	*0.247*			-0.021	*-0.771*	-0.036	*-1.599*
GCONS(-1)	0.032**	*2.119*	0.046***	*3.325*	0.078	*1.130*	0.020	*1.352*
MDEBT(-1)	-0.063***	*-3.061*	-0.044***	*-2.646*	-0.044**	*-2.149*	-0.021	*-0.979*
BDEBT(-1)	0.080***	*2.880*	0.065***	*2.971*	0.068**	*2.279*	0.014	*0.459*
TFP(-1)	0.018	*0.262*						
TARIFF(-1)			-0.007	*-0.320*				
SCAP(-1)					0.007**	*2.078*		
C	12.823	*3.056*	10.175	*2.312*	11.856	*2.396*	10.200	*2.267*
Short-run effects								
Δ(WS(-1))	0.231**	*2.220*	0.161	*1.460*	0.207	*1.599*	0.308**	*2.355*
Δ(GROWTH)	-0.001***	*-4.103*	-0.001***	*-2.587*	-0.001***	*-3.144*		
Δ(GROWTH(-1))							0.001	*1.258*
Δ(UD)	0.033	*0.787*	0.068	*1.485*	0.049	*0.881*		
Δ(UD(-1))							-0.062	*-1.360*
Δ(OPEN)	0.305***	*3.835*			0.290***	*3.543*		
Δ(OPEN(-1))							0.019	*0.198*
Δ(GCONS)	0.042	*1.623*	0.016	*0.747*	0.198**	*2.144*		
Δ(GCONS(-1))							0.056**	*2.329*
Δ(MDEBT)	0.053	*1.438*	0.011	*0.261*	-0.040	*-1.024*		
Δ(MDEBT(-1))							-0.033	*-0.785*
Δ(BDEBT)	-0.118*	*-1.925*	-0.030	*-0.467*	0.000	*-0.004*		
Δ(BDEBT(-1))							0.149**	*2.245*
Δ(TFP)	0.464	*1.042*						
Δ(TARIFF)			0.090	*1.055*				
Δ(SCAP)					-0.002	*-0.401*		
R^2	0.66		0.61		0.60		0.50	
DW	1.91		1.96		2.05		2.01	
BG	0.14		0.36		0.17		0.94	

Notes: The dependent variable is the adjusted wage share in first differences. Statistical significance at 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

8. The Comparative Political Economy of the labour share in historical perspective

The last step of the empirical analysis of this study is to go beyond the narrow concept of statistical significance (Ziliak and McCloskey, 2004) and explore the economic significance of the relative effects. To achieve that, it is necessary to test for the stability of the coefficients through the CUSUM test and calculate the standardized coefficients of the baseline specification (1) for each country in order to make them comparable. That allows to (a) evaluate

if the econometric results are consistent throughout the full period and whether unknown structural breaks exist; and (b) assess the relative sizes of the effects, providing a comparative political economy analysis on how different institutional settings have been affecting functional income distribution in each case during the last century. As reported in Appendix C, the cumulative sum (CUSUM) control charts for the baseline specification (1) provide no evidence for changes in the process mean, i.e. unknown structural breaks, in either country at the 5% level. This finding suggests that indeed finance has been integral to the capitalist system of production of all three countries. Table 7 summarises the standardised long-run coefficients for each case study.[16]

Table 7: Standardised long-run coefficients

	France	Sweden	USA
UD(-1)	0.037	0.630	0.007
OPEN(-1)	0.066	0.411	0.058
GCONS(-1)	1.384	-0.388	0.339
MDEBT(-1)	-1.023	-0.352	-0.798
BDEBT(-1)	0.246	-0.099	0.519

Notes: Calculations are based on the baseline specification (1). Only standardised long-run coefficients are reported.

Focusing on the coefficients that are statistically significant in the baseline specification (1) for France, the magnitude of the standardised coefficient of $MDEBT$ is smaller than that of $GCONS$ (in absolute values), hence the impact of welfare spending prevails. In Sweden, the standardised coefficients of statistically significant effects show that the positive impact of union density (UD) on the wage share is dominant over the negative effect mortgage indebtedness ($MDEBT$) and the positive effect of $OPEN$, as its magnitude is larger in absolute terms. Lastly, for the USA, the magnitudes of both financialisation variables, $MDEBT$ and $BDEBT$, are larger than the standardised effect of government spending. Comparing the two contradicting signs of the coefficients of the debt aggregates, the negative effect of the mortgage ratio is larger than the positive impact of the business debt ratio, therefore financialisation total effect on the wage share is negative, as expected.

Taking into consideration the standardised results for the three countries, the negative impact of household financialisation on the wage share is consistent in all of them, providing support for the political economy approach. This result suggests that indeed rising household indebtedness decreases worker's bargaining power, thus their share of national income (Kim

[16] The standardized coefficients are calculated as follows. The estimated coefficient obtained is multiplied by the ratio of the standard deviation of the explanatory variable over the standard deviation of the dependent variable.

et al. 2017) in historical perspective, rather than makes them demand higher wages to improve their financial position even in countries with strong trade unions structures like Sweden (Argitis and Dafermos, 2013). Nevertheless, the negative impact of mortgage debt is indeed weaker in Sweden, which implies that the disciplinary effects are limited in countries with strong labour power resources. From a Veblenian conspicuous consumption perspective, one could challenge these findings in terms of a potential reverse underlying causality. Veblen (1899) argued that people whose income is decreasing want to keep their consumption expenditure at the same level, thus they are willing to increase their indebtedness to cover the growing gap. Despite there is some logic in this argument, Veblen makes a fundamental restrictive hypothesis: he assumes that the commercial banking system is naïve enough to lend money without taking into account borrowers' income level. Beyond this logical inconsistency, recent empirical studies have shown that household borrowing is rather driven by real estate prices, and not by increasing income inequality (Moore and Stockhammer, 2018; Stockhammer and Wildauer, 2018)

In France, welfare spending also plays a key role for the determination of real wages, suggesting that declines in social spending decrease workers' bargaining power, as it includes unemployment benefits among other things, which is directly linked to their cost of job loss. In Sweden, the main driver of the wage share is union density which has a positive effect, providing evidence for Kalecki's (1954) argument that trade unions can decrease mark-ups, thus shifting income distribution towards higher wages. This result is in contrast with the findings of Bengtsson (2014b) who finds insignificant union density effects for the same period, using, however, a three-year averages model. According to the robustness estimation (and especially specification (5)), there is also weak evidence that corporate debt accumulation decreases the Swedish labour share, i.e. firms attempt to improve their financial position by squeezing wages (Hein, 2007; Argitis and Dafermos, 2013). For the USA, considering that the overall effect of financialisation is negative, welfare spending is the most influential determinant of its labour share, which, as in France, leads to higher real wages. In total, the main finding of the present study is that mortgage debt is consistently associated with decreases in the labour income shares of all three countries since the late 19th century. As scholars like Esteves (2011) and Fasianos et al. (2018) argue, using descriptive analysis, patterns of financialisation can be traced in many advanced economies even in the pre-WWII period. This study makes a further step by estimating the effects of financialisation on the labour shares of France, Sweden, and the USA covering the pre-WWII period and finding that it has been a key factor for.

Besides the main findings that had the expected signs, it is also meaningful to evaluate the rest findings and non-findings of this study. The most notable among them is the statistically insignificant coefficients of union density in France and the USA. From a Kaleckian perspective, that result is unexpected as in his framework unions strengthen workers, leading to a squeeze in the price mark-up (Kalecki, 1954). One possible explanation, as discussed earlier, is that collective bargaining in those countries is more decentralized, hence union membership is not as strictly linked with the wage setting negotiation as it is in the Scandinavian countries. Another possibility for those unexpected findings is that since the compiled historical union density series include data from different sources, discrepancies in measurement might influence the results, as even for the post-WWII period there are significant issues with the measurement of this variable (Visser, 2006).[17] The role of trade openness is also negligible, as for France and Sweden the coefficients change signs very often among specifications and are very rarely statistically significant, whilst in Sweden, it is consistently positive. That indicates that class relations and bargaining power with respect to wages has been relatively inelastic to international trade shocks in the former countries. In Sweden, it seems that the results are driven by the pre-WWII trade globalisation period, which, unlike the neoliberal globalisation period, is not motivated by class conflict, hence it does not benefit capital at the expense of labour (Palley, 2018). In a historical context, Roine et al. (2009) also find insignificant effects of trade globalisation on top income shares, using panel data analysis for the same period. In addition, the estimations of this study provide no support for the neoclassical capital-augmenting technology story, as the coefficient of TFP is insignificant for France and the USA, whilst it has a perverse positive impact for Sweden. This non-finding is in line with most empirical studies on the determinants of the wage share who find insignificant or negligible technology effects, implying that, in reality, the elasticity of substitution between capital and labour is not as large as neoclassicals assume. Additionally, in Sweden $GCONS$ has a surprising negative effect on the labour share (not robust though), which, as argued earlier, is not a totally unexpected finding as the pre-WWII form of social security system in this country was characterised by age, gender, and place discrimination, exacerbating income inequality. Last but not least, the real wage effects of the interest rate have the expected negative signs in France and Sweden, but they are statistically insignificant for all three countries. Accordingly, in the terms of Hein (2007), there is weak evidence that price mark-

[17] For instance, Visser (2006) notes that unionisation statistics for France are commonly inaccurate as they may include nonpaying members. Also, the series for the USA vary significantly depending on whether they come from the Current Population Survey or calculated using administrative data.

ups are interest-inelastic in historical perspective in France and Sweden, but not in the USA. As Hein and Schöder (2011) find positive interest payments effects on the US profit share (using the long-term interest rate though), the interest-elasticity of the US price-mark-ups seems to be a recent development.

9. Conclusions

A growing body of literature in social sciences argues that financialisation is a phenomenon that has not arisen for the first time since the early 1980s, as historical macroeconomic data indicate similar patterns in advanced economies even during the late 19th and early 20th centuries (e.g. Esteves, 2011; Fasianos et al. 2018). Interestingly enough, very few studies have attempted to examine the impact of financialisation on the macroeconomy in historical perspective[18], and especially its effects on income distribution. The only exception in the distribution literature is the historical panel data study of Roine et al. (2009) who focus on personal income inequality, finding that financial development increases top income shares. Regarding functional income distribution, the only historical data study that estimates the determinants of the labour share for Sweden is Bengtsson (2014b), who, however, does not test any hypothesis related to financialisation. The present study fills this gap in the empirical literature on income distribution by estimating the effects of mortgage indebtedness, corporate indebtedness, short-term real interest rate, real stock prices, and stock market capitalisation (among other variables) on the wage shares of France (1911-2010), Sweden (1891-2000), and the USA (1929-2015). Another advantage of using series with such long time dimension is that reliable time series analysis can be conducted, allowing to unveil important country-specific information, which in a panel data context is lost.

The econometric findings of the present study strongly suggest that financialisation decreases the labour income share in France, Sweden, and the USA. More precisely, the key financial variable is mortgage debt which decreases the wage shares of the three countries, confirming that accumulation of debt by households deteriorates their bargaining position, thus exacerbates income inequality, as suggested by Argitis and Dafermos (2013) and Kim et al. (2017). Similar results have been reported by Guschanski and Onaran (2018) and Wood (2017) for the post-WWII period, but the finding of the present study establishes that the balance of power between labour and capital has been subject to households' financial commitments not

[18] The vast majority of the empirical studies that examine financialisation in historical context center on business cycle analysis and the determinants of banking crises (e.g. Schularick and Taylor 2012).

only in the neoliberal era but at least since the early 19th century. In particular, this finding is of great significance as it shows that financialisation always mattered for coordinated market economies like France, for liberal market economies such as the USA, and for statist economies like Sweden. This result is more thought-provoking in the cases of coordinated and statist economies, i.e. France and Sweden respectively, where the distributional impact of finance should be comparatively modest in theory, as it is in the post-1980 period e.g. in Sweden (see Wood 2017). This outcome indeed challenges the traditional VoC typology and shows that to some extent it is biased from the post-WWII experience. For France, the estimations also show that welfare spending increased its labour share during the last century. The effect of stock price inflation on the French wage share is insignificant, implying that shareholder value orientation did not lead French firms to wage cutting to balance the increases in their overhead financial costs in historical perspective. As highlighted in section 2, rapid asset price inflation is rather a post-1980 development for France, and not a historical stylised fact. For Sweden, the other key variable, apart from mortgage debt, is union density which increases the labour share, confirming Kalecki's (1954) assumption that union density can reduce the mark-up, thus real profits. This underlines that indeed the well-established bargaining system of Sweden has been crucial throughout time. Also, this finding is consistent with the results of Bengtsson (2014b) who also finds a positive wage share impact of unionisation for approximately the same historical period in Sweden, but with statistically insignificant coefficients. Furthermore, the negative real wage effect of shareholder value orientation becomes evident in Sweden, both in terms of the effects of real stock prices and stock market capitalisation as well. Regarding the USA, the positive effect of government spending is the second consistently robust finding, showing that welfare expenditures increase the labour share, probably due to their negative effect on the cost of job loss, thus on the bargaining power of workers. The other statistically significant coefficient, i.e. business debt, has a perverse sign, whose economic intuition is obscure.

Recapitulating, the main findings of this study underline that the financialisation of the economy has been associated with increased household vulnerability at least during the last century in France, Sweden, and the USA. Nevertheless, variables which are directly linked to labour's bargaining power and the cost of job loss, i.e. union density and welfare expenditures, seems to have stronger impacts on real wages. Relating the findings of the present study with recent relevant studies on demand regimes who show that domestic aggregate demand has been wage-led since the mid-19th century (Stockhammer et al. 2018) several interesting policy conclusions can be drawn. First, financial regulation can contribute simultaneously to social

equality and better macroeconomic performance, as total demand reacts positively to increases in wage shares, whilst financialisation decreases them, at least during the last century. More precisely, according to the main results for the three countries restricting speculative mortgage borrowing to households and discouraging shareholder value orientation can be effective steps. Second, expanding the welfare expenditures and strengthening collective bargaining processes through trade unions are the other two essential steps towards social equality and optimal macroeconomic performance, as such policies will boost real wages, which in turn will increase total aggregate demand. Apparently, such conclusions have been suggested by most relevant studies who examine empirically the determination of wage shares and the nature of demand regimes in the Neoliberal period. The main contribution of the present study is that provides robust evidence that those policy recommendations, given the underlying nature of the distributional conflict between capital and labour, have been relevant for the last century or even more. Regarding future research, it becomes evident that country-specific characteristics matter as important cross-country differences among the three case studies are observed. A typical example with respect to the rest of the relevant literature is the negative effect of mortgage indebtedness whose effect is found to be statistically significant by authors who use individual country analysis rather than panel data, such as the present study, Guschanski and Onaran (2018), and Wood (2017). As new historical labour share series become available, future studies should focus on estimating the impact of financialisation on income distribution for other countries as well in order to examine to whether our current perception about stylised facts on income distribution is biased by the post-WWII or neoliberal experiences, or if some of those are indeed historical stylised facts.

Appendix

A1: Data sources

Table A1: Original data sources

Country	Variable	Period	Source
France	Wage Share (adjusted)	1896-2010	Piketty and Zucman (2014)
	GDP (real)	1896-2010	Piketty and Zucman (2014)
	GDP (nominal)	1870-2013	Jordà et al. (2017)
	Government Consumption	1896-2010	Piketty and Zucman (2014)
	Exports and Imports (real)	1896-2010	Piketty and Zucman (2014)
	Total Private Debt (nominal)	1870-2013	Jordà et al. (2017)
	Mortgage Debt (nominal)	1870-2013	Jordà et al. (2017)
	Real Stock Price Index	1854-2007	Le Bris and Hautcoeur (2010)
	Total Factor Productivity	1890-2012	Bergeaud et al. (2016)
	Interest rate (nominal)	1870-2013	Jordà et al. (2017)
	Inflation rate	1870-2013	Jordà et al. (2017)
	Trade Tariffs (average)	1900-2006	Roine et al. (2009)
	Stock Market Capitalisation	1930-2005	Roine et al. (2009)
	Union Density	1910-1959	Donado and Wälde (2012)
		1960-2014	OECD
Sweden	Wage Share (adjusted)	1875-2000	Edvinsson (2005)
	GDP (real)	1875-2000	Schön and Krantz (2015)
	GDP (nominal)	1875-2000	Jordà et al. (2017)
	Government Consumption	1870-2013	Jordà et al. (2017)
	Exports and Imports (real)	1875-2000	Schön and Krantz (2015)
	Total Private Debt (nominal)	1870-2013	Jordà et al. (2017)
	Mortgage Debt (nominal)	1870-2013	Jordà et al. (2017)
	Real Stock Price Index	1870-2013	Waldenström (2014)
	Total Factor Productivity	1890-2012	Bergeaud et al. (2016)
	Interest rate (nominal)	1870-2013	Waldenström (2014)
	Inflation rate	1290-2008	Edvinsson and Söderberg (2011)
	Trade Tariffs (average)	1900-2006	Roine et al. (2009)
	Stock Market Capitalisation	1930-2005	Roine et al. (2009)
	Union Density	1890-1959	Donado and Wälde (2012)
		1960-2014	OECD
USA	Wage Share (adjusted)	1929-2015	BEA NIPAs
	GDP (real)	1929-2015	BEA NIPAs
	GDP (nominal)	1889-2013	Jordà et al. (2017)
	Government Consumption	1929-2015	BEA NIPAs
	Exports and Imports (real)	1929-2015	BEA NIPAs
	Total Private Debt (nominal)	1870-2013	Jordà et al. (2017)
	Mortgage Debt (nominal)	1870-2013	Jordà et al. (2017)
	Real Stock Price Index	1891-2013	Shiller (2005)
	Total Factor Productivity	1890-2012	Bergeaud et al. (2016)
	Interest rate (nominal)	1890-2011	Shiller (2005)
	Inflation rate	1890-2011	Shiller (2005)
	Trade Tariffs (average)	1900-2006	Roine et al. (2009)
	Stock Market Capitalisation	1930-2005	Roine et al. (2009)
	Union Density	1881-1959	Donado and Wälde (2012)
		1960-2014	OECD

A2: Descriptive statistics, unit root tests, and correlation matrices

Table A2: Descriptive statistics and unit root tests

	WS	WSP	GROWTH	GCONS	UD	OPEN	MDEBT	BDEBT	INT	PS	TARIFF	TFP	SCAP
France													
Mean	76.38	71.68	22.56	13.65	16.53	34.83	17.93	52.05	-0.70	9.89	5.59	4.92	35.74
Median	76.42	71.51	13.58	16.31	14.20	31.84	14.65	55.49	1.22	4.73	4.30	3.20	25.78
Max	98.47	81.03	88.68	24.83	46.20	56.63	53.16	108.69	10.84	59.17	21.70	11.60	112.56
Min	60.17	59.17	-43.96	1.60	7.20	13.87	0.97	11.32	-57.06	1.41	1.02	1.10	6.05
Obs	115	106	104	106	105	106	96	90	103	114	116	117	78
ADF levels	0.40	0.07	0.01	0.98	0.19	0.87	0.99	0.55	0.02	0.86	0.11	0.99	0.62
ADF diff	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.02	0.00
Sweden													
Mean	69.91	67.26	37.53	17.75	51.11	5.51	34.82	29.34	0.42	13.0	5.17	5.00	37.95
Median	69.63	66.88	21.97	15.13	66.73	4.45	30.07	28.82	2.53	5.56	4.90	4.30	26.19
Max	81.85	79.96	199.35	37.74	83.86	14.84	79.40	54.36	23.95	72.94	11.00	11.00	147.12
Min	55.59	51.73	-81.36	6.16	0.70	1.68	11.48	9.71	-39.95	2.17	0.80	1.20	3.03
Obs	126	126	125	131	125	126	139	139	136	110	113	123	67
ADF levels	0.72	0.34	0.00	0.89	0.31	0.99	0.84	0.30	0.15	0.51	0.07	0.99	0.89
ADF diff	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.06	0.00
USA													
Mean	64.84	59.62	17.84	16.12	17.59	15.86	21.50	20.57	1.62	6.94	8.98	5.89	75.07
Median	65.09	59.37	18.86	14.44	13.55	11.96	18.74	20.57	1.93	5.038	6.00	5.70	62.45
Max	69.82	64.58	54.00	47.34	34.23	36.82	43.30	32.04	16.12	21.94	28.90	11.80	163.56
Min	60.54	55.82	-41.17	9.09	4.03	4.61	6.14	5.39	-17.12	1.30	1.44	1.70	33.00
Obs	103	97	86	87	125	87	125	125	121	148	116	123	77
ADF levels	0.58	0.27	0.00	0.31	0.51	0.99	0.69	0.51	0.00	0.93	0.00	0.99	0.79
ADF diff	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table A3: Correlation matrices

	WS	WSP	GROWTH	GCONS	UD	OPEN	MDEBT	BDEBT	INT	PS	TARIFF	TFP
France												
WS	1											
WSP	0.84	1										
GROWTH	0.20	-0.08	1									
GCONS	0.63	0.12	0.51	1								
UD	0.60	0.48	-0.19	0.02	1							
OPEN	0.19	-0.21	0.68	0.65	-0.53	1						
MDEBT	0.51	0.04	0.61	0.89	-0.22	0.78	1					
BDEBT	0.68	0.39	0.38	0.77	0.52	0.33	0.65	1				
INT	-0.18	0.09	0.04	0.18	-0.62	0.20	0.16	-0.09	1			
PS	-0.15	-0.45	0.47	0.47	-0.58	0.65	0.49	-0.06	0.12	1		
TARIFF	-0.21	-0.05	-0.41	-0.63	0.34	-0.74	-0.68	-0.60	-0.19	-0.35	1	
TFP	0.21	-0.02	0.63	0.87	-0.40	0.75	0.95	0.64	0.26	0.67	-0.64	1
Sweden												
WS	1											
WSP	0.99	1										
GROWTH	0.44	0.45	1									
GCONS	0.47	0.40	-0.32	1								
UD	0.79	0.79	0.55	0.90	1							
OPEN	0.46	0.46	0.61	0.78	0.63	1						
MDEBT	0.49	0.48	0.38	0.53	0.58	0.80	1					
BDEBT	-0.44	-0.45	-0.32	0.41	-0.45	-0.01	0.07	1				
INT	0.30	0.27	0.13	-0.09	0.18	0.47	0.17	0.32	1			
PS	-0.11	-0.12	0.45	0.40	0.28	0.75	0.68	0.23	-0.19	1		
TARIFF	-0.55	-0.52	-0.46	-0.93	-0.80	-0.71	-0.66	0.06	-0.42	-0.43	1	
TFP	0.73	0.72	0.62	0.94	0.85	0.87	0.84	-0.14	0.20	0.66	-0.88	1
USA												
WS	1											
WSP	0.19	1										
GROWTH	-0.41	-0.31	1									
GCONS	0.59	0.02	-0.13	1								
UD	0.79	-0.15	-0.33	0.60	1							
OPEN	-0.78	-0.43	0.46	-0.52	-0.75	1						
MDEBT	-0.34	-0.62	0.36	-0.57	-0.03	0.80	1					
BDEBT	-0.61	0.33	0.10	-0.57	-0.61	0.26	0.06	1				
INT	-0.23	-0.13	0.17	-0.23	-0.11	0.13	0.31	0.46	1			
PS	-0.52	-0.17	0.54	-0.39	-0.52	0.88	0.62	-0.09	-0.10	1		
TARIFF	0.16	0.62	-0.45	0.19	-0.34	-0.64	-0.65	0.35	-0.22	-0.57	1	
TFP	-0.06	-0.68	0.51	-0.27	0.28	0.84	0.87	-0.30	0.23	0.76	-0.85	1

A3: ECM specifications with two short-run lags – Testing down starting point

Table A4: ECM specifications with two short-run lags

	France		Sweden		USA	
	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*
Long-run effects						
WS(-1)	-0.209***	*-2.817*	-0.037	*-0.419*	-0.221***	*-2.610*
UD(-1)	0.014	*0.125*	0.030*	*1.774*	0.013	*0.421*
OPEN(-1)	-0.027	*-0.544*	0.418	*1.507*	0.020	*0.682*
GCONS(-1)	0.134	*1.154*	-0.152*	*-1.989*	0.043**	*2.150*
MDEBT(-1)	-0.034	*-0.378*	-0.316***	*-3.566*	-0.075***	*-2.761*
BDEBT(-1)	0.007	*0.311*	-0.021	*-1.020*	0.108***	*2.556*
C	14.501	*2.926*	2.778	*0.447*	13.023	*2.477*
Short-run effects						
Δ(WS(-1))	0.105	*0.733*	-0.132	*-0.964*	0.342**	*2.511*
Δ(WS(-2))	0.080	*0.507*	-0.113	*-0.885*	-0.143	*-1.042*
Δ(GROWTH)	-0.003	*-0.284*	0.000	*-0.859*	-0.001***	*-2.705*
Δ(GROWTH(-1))	0.003	*0.171*	-0.001	*-1.274*	0.000	*-0.712*
Δ(GROWTH(-2))	0.026*	*1.832*	0.000	*-0.561*	-0.001	*-1.149*
Δ(UD)	0.151	*0.480*	-0.319***	*-2.837*	0.019	*0.342*
Δ(UD(-1))	-0.193	*-0.706*	-0.007	*-0.056*	-0.009	*-0.181*
Δ(UD(-2))	0.125	*0.430*	-0.032	*-0.282*	0.028	*0.579*
Δ(OPEN)	-0.070	*-0.858*	-1.031***	*-2.210*	0.350***	*3.546*
Δ(OPEN(-1))	0.123	*1.435*	0.333	*0.454*	0.012	*0.110*
Δ(OPEN(-2))	-0.106	*-1.291*	1.161	*1.597*	0.096	*0.907*
Δ(GCONS)	1.604***	*3.476*	0.022	*0.142*	0.109***	*3.928*
Δ(GCONS(-1))	0.190	*0.381*	-0.018	*-0.117*	0.017	*0.538*
Δ(GCONS(-2))	0.192	*0.338*	0.252	*1.476*	-0.020	*-0.626*
Δ(MDEBT)	0.002	*0.007*	0.294***	*3.223*	-0.010	*-0.150*
Δ(MDEBT(-1))	0.055	*0.189*	-0.033	*-0.330*	0.061	*0.810*
Δ(MDEBT(-2))	-0.104	*-0.390*	-0.091	*-0.904*	0.001	*0.015*
Δ(BDEBT)	-0.041	*-1.148*	0.022	*0.357*	0.017	*0.238*
Δ(BDEBT(-1))	0.038	*0.985*	0.006	*0.116*	-0.022	*-0.254*
Δ(BDEBT(-2))	-0.072**	*-2.284*	0.136**	*2.557*	-0.141*	*-1.832*
R^2	0.63		0.57		0.66	
DW	2.23		1.95		2.07	

Notes: The dependent variable is the adjusted wage share in first differences. Statistical significance at 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

A4: Specification (1) CUSUM control charts

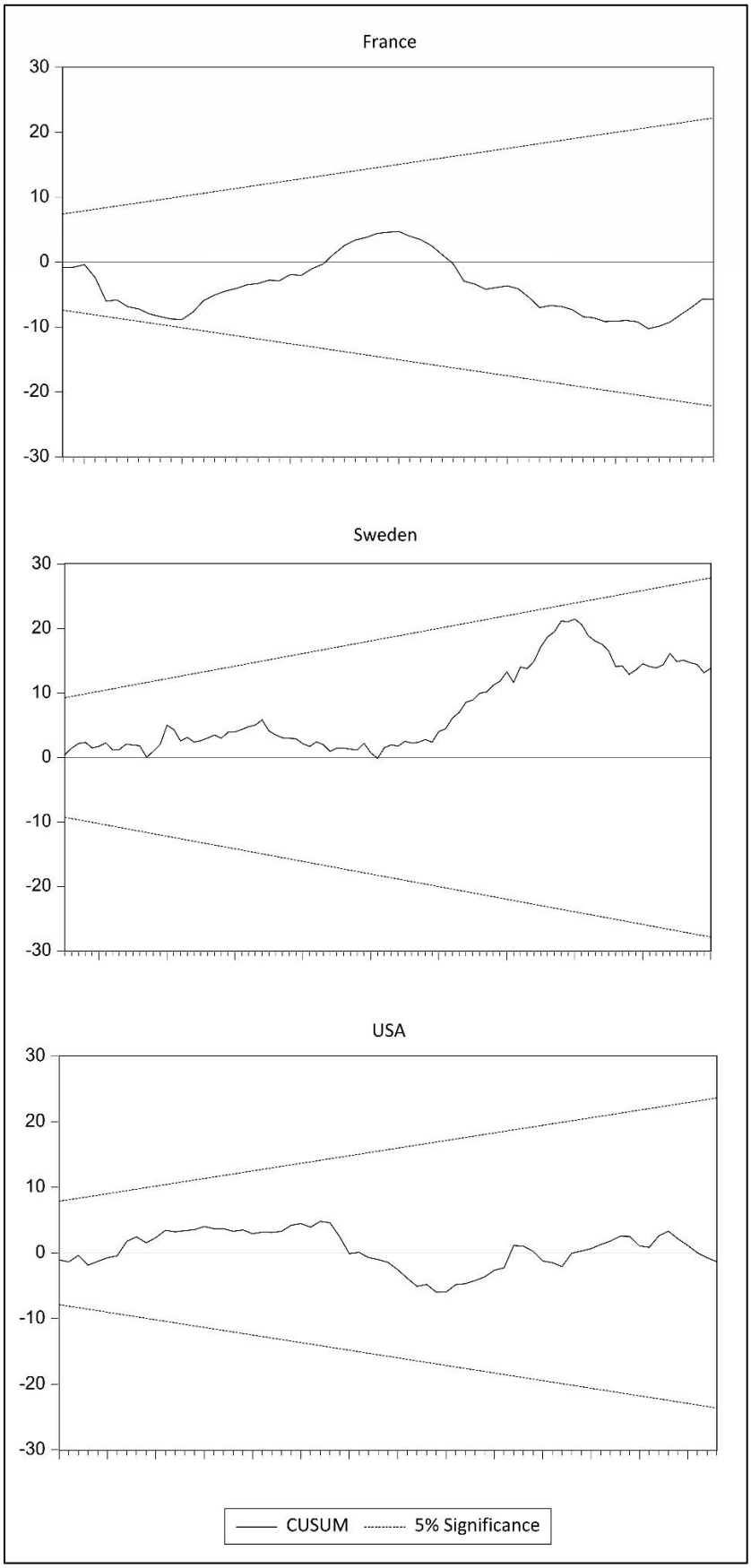

Figure A1: CUSUM control charts

Chapter 3

Financialisation and the Top 1% in the Neoliberal era: A Comparative Political Economy Perspective

1. Introduction

The neoliberal regime of accumulation has brought important structural changes in most advanced political economies. The most widely acknowledged and common among these changes is the rise in income inequality, which has been highlighted by the political economy approach (Stockhammer, 2015), but also by neoclassical scholars and international institutions (Karabarbounis and Neiman, 2014; IMF, 2017). The issue of inequality also gained attention within a wider audience during the post-2007 crisis era through the popular works of Piketty (2014) and Atkinson (2015). Piketty and Atkinson offer a discussion of the structural causes behind the rise in income inequality and go beyond the usual measures of income inequality like the labour share and the GINI coefficient, stressing the underlying politics behind the income distribution indicators. Piketty pinpoints the significance of top income shares, as they represent specific social groups with distinct economic and political interests. The top one per cent income share has become the most popular among those measures, as it featured prominently in the recent US presidential election campaign of Senator Bernie Sanders. The public discussion about the rise of the top one per cent has mainly focused on the issue of taxation, rather than on the politics behind it or on the causes behind its rise. The political interest of this indicator lies in the fact that it includes capital owners and the working rich, i.e. includes both capitalists and workers who form a diverse social group. Such a social group is of great interest as it goes beyond the Classical Political Economy workers-capitalists dichotomy which stresses only the role of distribution between wages and profits, as in Smith (1776), Ricardo (1817), and Marx (1867, 1885, 1894). Examining how diverse but powerful social groups can form coalitions to protect their interests, i.e. their share of the national income can unveil how the distribution of power in the society has changed since the times of classical political economists.

The vast majority of the studies on the determinants of income inequality has centered either on functional income distribution (Bengtsson and Ryner, 2015) or on personal income inequality indices (Daudey and García-Peñalosa, 2007; Checchi and García-Peñalosa, 2010), examining mainly the impacts of skill-biased technical change, trade globalisation, and labour market institutions. In most of these studies, an important aspect of neoliberalism is missing: the effects of the financialisation of the economy. In general, financialisation is a broad term that refers to the increased dominance of the financial sector over the real economy, but, still, there is no unifying framework for the analysis of its macro and microeconomic effects. So far, the analysis of financialisation is based on the separate examination of specific channels of influence, e.g. Minskyan financial fragility (Nikolaidi and Stockhammer, 2017). Regarding distribution, several studies have explored the impact of different financialisation channels on the functional distribution of income, reporting that financialisation has benefited disproportionately capital at the expense of labour. Such channels include rising household indebtedness (Guschanski and Onaran, 2018; Wood, 2017), shareholder value orientation (Lin and Tomaskovic-Devey, 2013; Alvarez, 2015; Dünhaupt, 2017; Köhler et al., 2018), and financial globalisation (Stockhammer, 2017). A small strand in the distribution literature also estimates the effects of financialisation on the top one per cent income share, providing evidence that higher income inequality is induced by the expansion of the financial sector (Roine et al., 2009; Volscho and Kelly, 2012; Dünhaupt, 2014; Flaherty, 2015; Godechot, 2016; Huber et al. 2017). Although, a drawback of the literature is the extensive use of panel data analysis which omits crucial country-specific information and does not allow a thorough comparative political economy analysis. The very few studies which do focus on the country level, centre exclusively on the liberal market economy of the USA (Volscho and Kelly, 2012; Keister and Lee, 2014), overlooking other varieties of capitalism across the world. Thus, several important questions remain open and unanswered: Is financialisation affecting the top one per cent income share and does that occur through the same channels in all types of economies? How different are the results in liberal and coordinated *Varieties of Capitalism* (VoC) (Hall and Soskice, 2001)? Can the regulation of the financial sector lead to a more egalitarian distribution path? What other factors supported the rise of the top one per cent in the neoliberal era?

The aim of the present chapter is to seek answers to those questions, responding to the call of Hager (2018) for more thorough studies on the drivers of top income shares in different types of economies. To achieve that, this chapter follows a time series-based comparative

political economy approach, focusing on four case studies that represent four distinct varieties of capitalism in the neoliberal era. The first case study of this chapter is the archetypal liberal market economy (LME) of the United States (1974-2011), which was shocked by the asset (housing) market collapse of 2007-8. The second case study is the export-driven economy of Germany (1972-2010), a sector coordinated market economy in terms of its labour market, which has also been governed mostly by conservative governments and its growth in the neoliberal era was driven by its exports (Stockhammer et al., 2016), i.e. trade globalisation. The third case study of this chapter is the social-democratic nation coordinated market economy (NCME) of Sweden (1981-2012), which represents the Nordic model of capitalism during neoliberalism, i.e. a small open economy with an extensive welfare state and strong trade union institutions. The selection of these countries as case study aims to offer a thorough comparative analysis on which channels of neoliberalism and financialisation have contributed to the rise of the top one per cent income share in four diverse examples of advanced political economies. Besides the common explanatory variables that include labour market institutions, trade globalisation, and technical change, the goal of this study is to compare the impacts of different financial variables on the top one per cent, aiming to unveil cross-country discrepancies. In asset-based LMEs where speculative asset price dynamics are more influential for the macroeconomic, the effects of shareholder value orientation should be relatively stronger. The impacts of private debt ratios are expected to be relatively stronger in credit-based CMEs, where the financial system is more regulated mainly operating through the banking system. Trade globalisation is anticipated to be dominant in the neo-mercantilist, export-oriented economy of Germany. In Sweden, it interesting to evaluate the effects of household debt since as a statist-developmentalist country (Schwarz and Seabrooke, 2008) those might be controversial. This is due to the protection of indebted homeowners by the state which can diversify the disciplinary effect of household debt accumulation (Froud et al., 2002; Langley, 2007; Argitis and Dafermos, 2013; Kim et al., 2017; Wood, 2017).

The methodology that is followed is based on time series econometric analysis and more specifically on the unrestricted error-correction model (ECM). This model allows assessing the long as well as the short-run effects of the explanatory variables, yielding unbiased estimates when the variables are integrated of either order zero or one.

The second section of this chapter provides a descriptive comparative statistical analysis of the evolution of the top one per cent income shares in the United States Germany, and Sweden since the 1970s and contrasts them with the fluctuations in financial variables such

as share prices, household debt, and corporate debt during the same period. The third section presents the theoretical arguments that link the rise of financialisation during the neoliberal era with changes in the distribution of power, thus with the rise in income inequality. Additionally, the third section also discusses thoroughly the empirical findings of the studies that explore the impact of finance on the top one per cent. The fourth section presents the specifications that are estimated and justifies the choice of the unrestricted error-correction model as estimating technique. Section five reports the baseline econometric findings for each country and the results of five additional robustness specifications. Section six outlines the results of the calculation of the standardised coefficients for the baseline specification in order to assess and compare the political economy and policy implication of the main econometric findings.

Overall, the key findings of the present study are as follows. In Germany, an export-oriented coordinated market economy, the three key variables are union density, government spending, and trade openness, which do exhibit the anticipated negative, negative, and positive signs, respectively. Regarding financial variables, the real share price index has a positive short-run effect, but a perverse negative impact in the long-run. In Sweden, the results show that the rise in corporate indebtedness and shareholder value orientation increase the top one per cent income share. In contrast, household debt has a perverse negative impact, probably due to the fact that indebted households are more protected in this economy, as discussed later in section seven. Last, in the United States, shareholder value orientation and household debt accumulation contributed to the rise of the top one per cent, along with the decline in the rate of unionisation. The strong effect of share prices is indeed expected as the United States represent the asset-based liberal market economy model.

2. The evolution of the top 1% in SCMEs, NCMEs, and LMEs in the neoliberal era

Income inequality and the term ‘top one per cent’ started featuring prominently in the public discussion only after the 2007-08 financial collapse, despite wage shares in most advanced economies have been falling since the early 1980s (see Karabarbounis and Neiman, 2014; IMF, 2017). The publication of Piketty’s opus magnum *Capital in the Twenty-first Century*, which highlights income inequality as one of the primary problems of political economy, played a pivotal role in this regard as it became popular within academia, politicians, and the general public. Piketty’s analysis involves different measures of inequality, stressing measurement

issues but also their underlying political implications. Among those measures, the top percentile income share features prominently, as its historical evolution is of particular interest both from a quantitative and qualitative perspective. From a quantitative perspective, its explosive increase in the neoliberal period is a phenomenon that occurred mainly in the Anglophone countries, rather than in continental Europe or in Japan (Piketty, 2014, pp. 315-321). From a qualitative perspective, the composition of the top percentile is also very significant, since according to Piketty (2014, pp. 276-278) the demographics of this indicator have changed compared to the early 20th century. More precisely, at the beginning of the 20th century, the top one per cent used to represent the rentier class, i.e. it was constituted primarily by income from capital. This has changed in the neoliberal era, where labour income prevails over capital income in the top one per cent of advanced political economies.[19] This discrepancy translates to a crucial demographic change: the top percentile has become the income share that includes capital owners and the top managerial class, i.e. the working super-rich. This change in the composition of this social group in the late 20th century has important political and economic implications. The first step in the analysis of the top percentile income share in this study is to examine the evolution of this indicator in four distinct Varieties of Capitalism: the Dirigiste, sector coordinated French economy, the export-driven, sector coordinated German economy, the social democratic nation coordinated economy of Sweden, and the liberal market economy of the USA.

Starting with the archetypal liberal market economy of the United States has experienced the most dramatic increase in its top percentile income share, along with other anglophone countries, as highlighted in Piketty (2014). Starting from slightly over 8 per cent of GDP in 1975, the top percentile reached the first peak at over 20 per cent in 2001, i.e. the collapse of the dot-com bubble. This tremendous expansion of the top percentile income share was followed by a slowdown reaching less than 16 per cent in 2003, where a new rapid increase began. The second wave of expansion ended with the Wall Street collapse of 2007-8 where it approached 23 per cent of national income, its all-time peak during neoliberalism. As expected, the expansion in the liberal market economy of the USA is much more rapid compared to the coordinated economies discussed above. At its peak, the income share of the top one per cent in the USA was at least double that of Germany and Sweden. Also, it is worth mentioning that

[19] According to Piketty (2014) income from capital exceeds income from labour only in the top 0.1 per cent incomes share.

the two declines occurred during financial collapses, which implies that the US top percentile is linked to shareholder value fluctuations, as anticipated in an asset-based liberal economy.

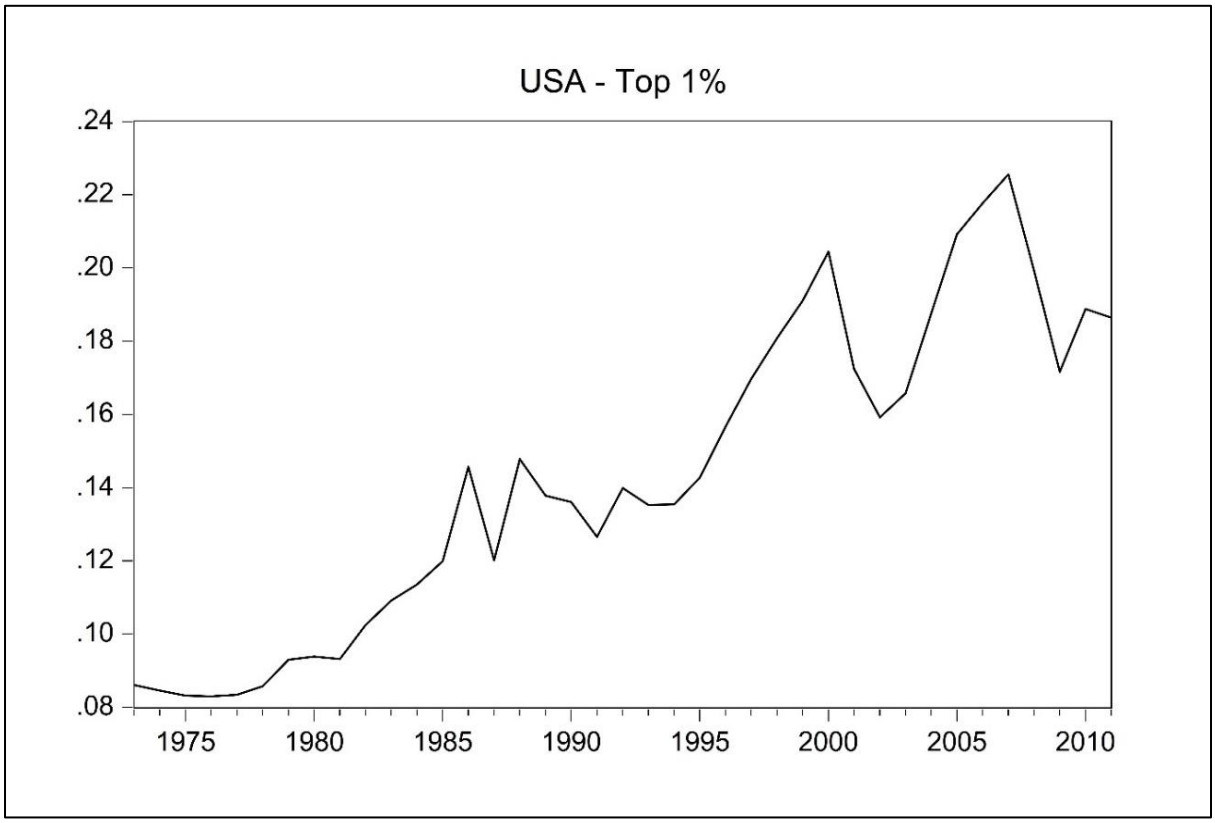

Figure 1: USA – Top 1% (Source: World Inequality Database)

For the export-oriented, coordinated market economy of Germany, the picture is slightly different as its top percentile rose rapidly only after 1995, and especially after 2002 with the establishment of the common European currency and the Hartz reforms. Between 1972 and 1990, i.e. before the German reunification treaty of 1990, the income share of the top one per cent remained relatively stable between 10 and 11 per cent of GDP, followed by a mild slowdown to slightly over than 9 per cent during the 1990-1995 transition period. In the succeeding period, i.e. the era of European integration and the Hartz reforms, the top one per cent income share in Germany grew substantially until the 2007-8 financial meltdown. That becomes more evident in the 2002-2008 period, where the income share of the top percentile increased from around 10.5 per cent to over 14 per cent. This rapid rise is probably related to the pro-capital Hartz reforms which included the decrease of unemployment benefits, workforce casualisation, and the provision of start-up grants to new entrepreneurs. The political instability in Europe after the 2007-8 crisis had an effect on the income of the top percentile in Germany, declining to approximately 13 per cent in 2010. Summarising, it seems that the

neoliberal accumulation regime did not affect the top percentile in Germany in its early phase, i.e. the 1980s, where its trend is stable. The big shift occurred as European political and economic integration proceeded in the late 1990s and the 2000s. It must be noted that in comparison with Sweden (see below), the income share of the German top one per cent has been substantially higher during Neoliberalism. This shows that on average the German top class earns substantially more than its Swedish counterpart.

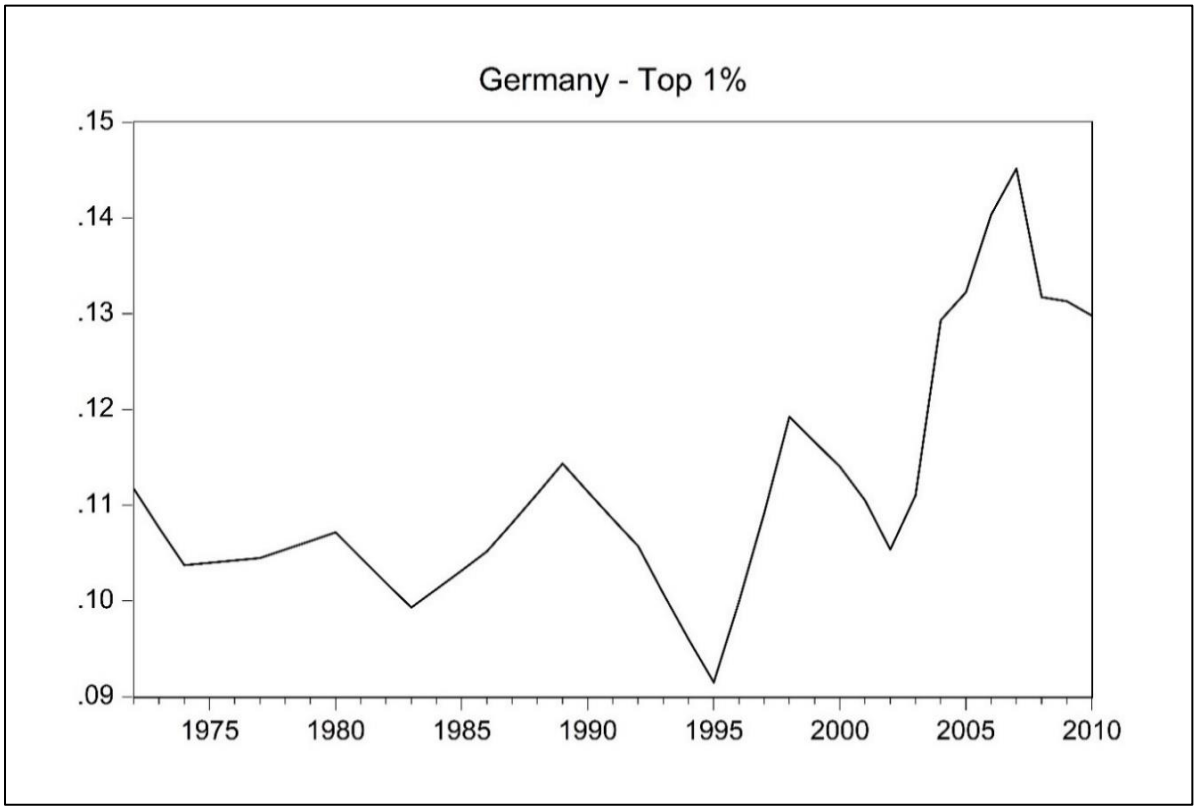

Figure 2: Germany – Top 1% (Source: World Inequality Database)

The impact of neoliberalism on the top one per cent income share becomes quite evident in the case of Sweden, despite its long social democratic tradition. The income share of the top one per cent rose steadily from around 4 per cent in 1982 to approximately 11 per cent in 2001. This great increase of 7 per cent is even larger than the 6 per cent expansion of the top percentile in Germany over the period 1995-2008. Between 2001 and 2012 the Swedish top one per cent fluctuates noticeably. From 2001 to 2003 a sharp decrease to slightly over 7 per cent occurred, followed by an equally sharp rise to almost 10 per cent in 2007. Smaller fluctuations are observed in the post-2007-8 crisis period, with the Swedish top percentile stabilising between 8 and 9 per cent of GDP. Overall, the level of the income share of the top one per cent in Sweden started from quite low in the early 1980s compared to Germany. The great expansion of the top one per cent occurred only after the mid-1990s where it eventually caught up with

the rest coordinated economies at around 9-10 per cent of GDP. Despite its social democratic welfare state tradition, Sweden failed to avoid the rise of the top one per cent like in most countries. This shows that the drivers of its top percentile are other than the government intervention, which has been more influential for the functional distribution of income between profits and wages.

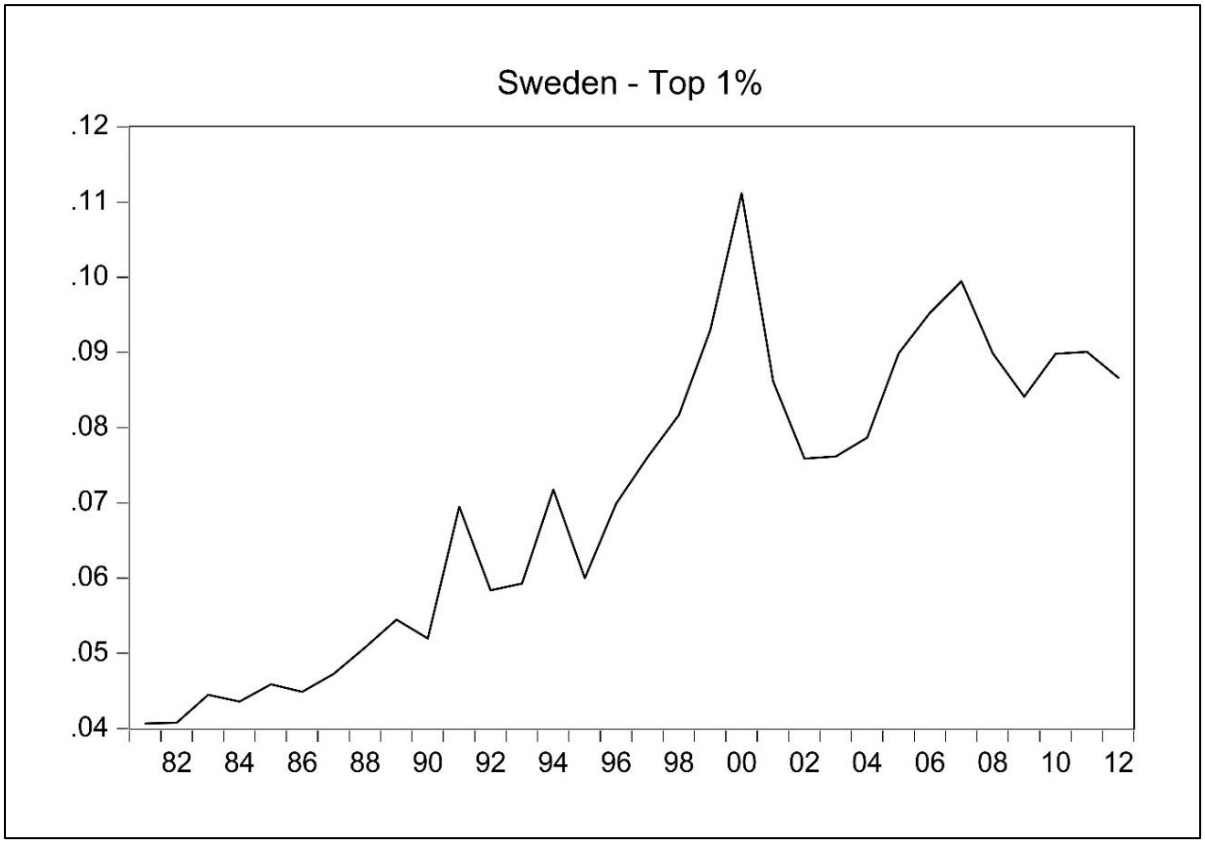

Figure 3: Sweden – Top 1% (Source: World Inequality Database)

3. Financialisation, power relations, and the Top 1% in the neoliberal era

The distribution of income, and thus income inequality has been a central problem in political economy since the times of the classical political economy. Ricardo (1817) was among the first scholars within political economy that stressed the importance of changing power relations for class conflict, hence the distribution of income between workers, capitalists, and rentiers. Of course, the distributive conflict is also central in Marx (1867, 1885, 1894) who endeavours to link income distribution with the occurrence of endogenous crises of the capitalist system. Inspired by the classical political economists, the field of Power Resources Theory (PRT) has emerged during the late 1970s attempting to explain discrepancies in welfare state regimes across countries (Stephens, 1979; Korpi, 1983). In addition, PRT offers a basic analytical

framework for the determination of income distribution which has become a key reference point for the top income share literature (see Hager, 2018). According to this framework, when workers achieve to organise themselves into trade unions and actively support left-wing political parties, they can exert power over their employers and achieve a more egalitarian distribution of income. As the top one per cent depicts a dominant social group of our times, strong collective bargaining institutions and redistributive policies should decrease its share of the GDP. Naturally, this argument is not novel, as Kalecki (1954) also argued that the stronger workers become by organising themselves into unions, the more likely is that they will achieve to decrease income inequality.

Regarding other changes in the global economy, what is missing in the classical PRT income distribution framework is how different aspects of neoliberalism might be affecting income inequality. This shortcoming comes from the fact that the framework was initially developed during the early phases of neoliberalism. Rodrik (1997) raises the issue of income inequality at the international level by discussing the impact of trade globalisation and capital mobility. Rodrik argues that capital mobility tends to benefit the most mobile factor of production, i.e. capital, instead of the abundant factor. This translates to increased capital gains both in advanced and developing economies, suggesting that income inequality either in the form of higher profit shares or rising top income shares will be induced by trade openness. Harrison (2002), Jayadev (2007), and Stockhammer (2017) provide empirical evidence for Rodrik's argument, showing that trade openness and capital mobility decreases the wage shares of advanced and emerging economies.

Another main aspect of neoliberalism that is missing in the early PRT is how the financialisation of the economy changes power relations, thus affects income distribution. The concept of financialisation is ill-defined within the literature as it includes several dimensions. In general, financialisation refers to the phenomenon of the increased dominance of the finance sector and its actors over the real economy, which has important behavioural as well as macroeconomic implications. Studies within the political economy tradition have proposed different channels through which financialisation has been correlated with increases in inequality and top income shares in neoliberalism (e.g. Hein, 2015). Financialisation in advanced economies during neoliberalism has four distinct dimensions: (i) financial globalisation; (ii) housing market financialisation; (iii) corporate financialisation the form of rising financial overhead costs due to business indebtedness; and (iv) the financialisation of the corporate governance. Despite scholars have explored these channels separately from a

theoretical and an empirical perspective, still, there is no coherent theory of financialisation that includes all aspects in a unifying framework. Such a grand theory of financialisation would allow distinguishing which channels of financialisation are linked to the decline of the wage shares and which are related to the rise of top income shares. However, creating such a unifying theory is a non-trivial task, thus it is beyond the scope of this chapter to provide it. As the existing empirical studies on the impact of financialisation on the top one per cent, this study seeks to examine which channels of financialisation have been dominant in different countries. Such results allow drawing important conclusions on differences and similarities in relation to the existing literature, which eventually will enhance our understanding of this phenomenon and provide necessary information for the creation of a unifying framework of financialisation.

A first attempt to outline how financialisation could alter power relations and thus induce higher income inequality can be found in the seminal paper of Lazonick and O'Sullivan (2000). This paper argues that financialisation has made shareholders to press firm managers to become short-termists, i.e. increase their debt ratios in order to buy back shares aiming to maintain the value of share prices in the short-term in high levels, i.e. maximise dividend payments. This procedure leads to increases in firms' overhead costs, so managers tend to squeeze wages in order to improve the financial position of the firm, inducing higher income inequality. As shareholder value maximisation aims to increase payments to shareholders, which are a vital part of the income from capital in the top income shares, the rise of the top percentile in the neoliberal era is linked to this process.

Another channel through which the financialisation of the economy have changed the foundations of the classical PRT income distribution approach is the rapid growth of household debt accumulation. The argument that increased levels of household debt decrease the bargaining power of labour first appeared within the Foucauldian political economy tradition (Froud et al., 2002; Langley, 2007). Argitis and Dafermos (2013), Kim et al. (2017) and Wood (2017) have elaborated this point by claiming that this deterioration in workers' bargaining power can lead to higher income inequality. This occurs as increased debt service commitments raise the cost of job loss of workers; thus, they wish to maintain their current job, i.e. secure the current inflow of income, even by accepting a lower wage rate in order to avoid defaulting on their debt and lose their residence (since the vast majority of household debt is indeed mortgage debt). Furthermore, the interest payments regarding the service of household debt commitments constitute an upward redistribution of income towards the non-productive, financial sector. As interest payments are income from capital, which dominates the

composition of top income shares, rising household indebtedness may be indeed connected to the increase of the top one per cent. However, Argitis and Dafermos (2013) claim that the linkage between household indebtedness and income inequality is not straightforward as it depends on domestic labour market institutions. More precisely, they argue that in a country with strong pro-labour collective bargaining structures, like a Nordic NCME such a Sweden, workers can be powerful enough to demand higher wages to enhance their financial position. In this case, household debt can indeed lead to lower income inequality. Contrariwise, in a liberal market economy where labour market institutions do not protect the working class, the impact of household debt on income inequality will be positive, as it induces working class' self-discipline, as suggested by Foucauldian scholars.

The financialisation of non-financial corporations is a third channel which affects power relations, challenging the relevance of the classical PRT framework. This channel of influence is particularly understudied in the literature, as very few scholars have examined it either from a theoretical or an empirical perspective. Argitis and Dafermos (2013) discuss the potential implications of corporate indebtedness for income inequality. As corporate debt increases the financial position of the firms worsens, hence firm managers tend to attempt to limit wage growth to counterbalance this deterioration. If firms are powerful enough to achieve that, then corporate indebtedness will decrease the wage income. According to Lin and Tomaskovic-Devey (2013), growing household indebtedness also has a positive effect on elite workers who are indeed part of the top percentile. Their argument is that the redistribution of income from productive non-financial firms to financial corporations tends to favour high-skilled elite workers who can be employed in the latter, instead of the unskilled lower working class which cannot reallocate easily.

Focusing on the empirical literature that explores the impact of financialisation on the top one per cent income share, very few studies can be found. The first empirical study that explores the impact of finance on top income shares is the seminal paper of Roine et al. (2009). This study utilises a panel dataset of 16 economies over the course of the 20th century (1900-2000). To estimate the top income shares equations the authors use a standard first differenced, fixed effects GLS regression model, which theoretically yields unbiased estimates utilising samples such large size. The main dependent variables include the top one per cent, the top 0.1 per cent, the next nine percentiles of the top decile (Top10-1), and the bottom nine deciles. One of the main explanatory variables regarding financialisation is dummies for banking and currency crises, and the development of the financial sector proxied by Bank deposits, Stock

market capitalisation, and Total market capitalisation. The other independent variables include trade openness, government spending, GDP per capita, and the marginal tax rate. The econometric findings suggest that both bank deposits and stock market capitalisation induce increases in the top income shares. In addition, banking crises affect negatively top income shares, as such crises lead to rapid decreases in shareholder value which is linked to capital income, which prevails in top income shares. Both results offer support to the shareholder value orientation hypothesis. Moreover, the results show that the effects of trade globalisation do not seem to have a significant effect on top income shares over the 20th century.

In a more recent empirical study, Volscho and Kelly (2012) estimate the effects of financialisation on the top one per cent of the USA over the period 1949-2008. The econometric estimations of this study utilise the single-equation error-correction model, in order to estimate the short and the long-run effects of the independent variables. The main financialisation variables used in this study are the real S&P 500 Composite Index and the Shiller Home Price Index. Other independent variables include the real GDP, the unemployment rate, trade openness, union membership, the marginal tax rate, and dummies for the political party that prevails in the Congress and the party of the elected president. The main regression findings provide robust evidence that the top percentile in the USA during the twentieth century was driven by the governing party, declining unionisation, tax rate policy, and financial asset bubbles. The positive effects of the S&P 500 are consistent in the short- and the long-run, while both are statistically significant at the 1 per cent level. Regarding the second financialization variable, the Shiller Home Price Index, it does have the expected positive sign in the short- and the long-run, but only the latter coefficients are indeed statistically significant. Both results suggest that asset price booms induce income inequality since such booms increase capital income which is a large portion of top income shares. Particularly the home price booms may be also related to residential investment by elite workers, who are part of the top percentile in the neoliberal era, which creates an additional capital income channel that increases income inequality.

Another econometric study that examines the determinants of income inequality in the US economy over the period 1967-2010 is the paper of Van Arnum and Naples (2013), who, however, focus on the GINI coefficient rather than on top income shares. The main explanatory variables related to financialisation that is used is the percentage value added to GDP by the Finance, Insurance, and Real Estate (FIRE) sector, in order to capture the dominance of financialisation over the real economy. The econometric estimations based on the Prais-

Winsten[20] methodology and standard first differences models provide robust evidence that the size of the FIRE sector increased the GINI coefficient in the USA. This constitutes additional evidence that financialisation not only induced higher income shares in the USA as shown in Volscho and Kelly (2012) but also gave rise to overall income inequality as measured by the GINI coefficients.

Focusing on a panel of 13 OECD countries between 1980 and 2010, Dünhaupt (2014) estimates the impact of corporate governance and financialisation on various measures of income inequality, including the top one per cent. The regressions of this study are based both on random and fixed effects panel data models, allowing for panel-corrected standard errors in the latter. Regarding the main explanatory variables, Dünhaupt uses stock market capitalisation and net dividend payments as a share of value added by non-financial corporations as proxies for shareholder value orientation. Other variables include power resources indicators such as union membership, left cabinet strength, unemployment, and social spending, along with trade openness, FDI outflows, technical progress, top marginal tax rates, and female participation. The results of the estimations show that the two shareholder value indicators are associated with greater income inequality either in terms of the GINI coefficients or in terms of the top percentile. This once again suggests that increases in capital income due to rising share prices benefit disproportionately top incomes. Union density, growth, top tax rates, and trade globalisation are also found to be statistically significant and lead to the decline of top income shares.

The empirical study of Flaherty (2015) is another case which shifts the focus from the case study of the US economy by estimating the determinants of top percentile for a panel of 14 OECD countries over the period 1990-2010. The econometric estimations of this study are based on fixed-effects OLS regression models and the Arellano-Bond Generalised Methods of Moments (GMM) dynamic approach. The explanatory variables include the domestic total credit volume, the FIRE gross operating surplus, financial globalisation, market capitalisation, banking sector liberalisation, banking supervision, a financial reform index, government consumption, unionisation, trade openness, economic globalisation, capital taxation, and female labour force participation. As anticipated trade globalisation, government spending, and union density exhibit positive, negative, and negative effects, respectively, whilst they are statistically significant in the vast majority of the estimations. This shows that indeed inequality

[20] The Prais-Winsten model is a variation of the Cochrane-Orcutt least squares estimation that take into account the first observation in order to deal with serial correlation of AR(1) type in linear models.

is exacerbated by enhanced capital mobility, and declining unionisation and welfare spending. With respect to financialisation, the econometric results indicate that the FIRE gross operating surplus has a robust positive impact on the top one per cent, keeping its statistical significance at the 1 per cent level in all cases. The effects of financial globalisation, banking liberalisation and supervision, and the financial reform index also have the anticipated positive signs, providing further evidence that financialisation benefits disproportionately the top income shares. Overall, the findings show that the shift towards the financial sector either in terms of its size or in terms of liberal institutional towards this direction has shaped power resources during neoliberalism in a wide range of advanced economies leading to the rise of top income shares. A drawback of using measures of financialisation related to the size of the financial sector or policy decision is that one cannot draw conclusions about the validity of specific behavioural assumptions, such as the shareholder value maximisation hypothesis or the household debt-labour bargaining power nexus.

Godechot (2016) contributed to the study of the determinants of income inequality - including top income shares- by extending both the time horizon to 1970-2011 and the number of case studies included in the panel dataset to 18 advanced economies. This study include a wide variety of different measures of financialisation including net distributed income as a proxy for shareholder value orientation, household debt and household shares (share of GDP) as a proxy for household financialisation, and non-financial firms' financial income and assets (share of GDP) as a proxy for the financialisation of non-financial firms, among others. Other control variables include the GDP per capita, union density, import prices, and stock exchange indices. The author initially chooses to estimate the specifications of this study through classical fixed-effects models. As a further step, he also uses error-correction regressions, including a lagged dependent variable as an explanatory variable, in order to account for issues of serial correlation handle potential reverse causality problems. As in the study of Flaherty (2015), Godechot's econometric findings suggest the main driver of top income shares has been the growth and the profitability of the financial sector, with corporate and household financialisation play a secondary role. The author's interpretation of the results is that the deregulation of the financial sector in the neoliberal era allowed rising banking concentration and profitability which fueled persistent increases in financial rents. As financial rents are linked to top income shares this led to their explosion during the late 20th and early 21st century.

Finally, the most recent empirical study that scrutinises the determinants of the top percentile income share is the paper of Huber et al. (2017). This study utilises a panel dataset

of 18 advanced industrial democracies that covers the period from 1960 to 2012, the longest period covered in any relevant study of the post-World War II period. The main goal of Huber et al. (2017) is to evaluate whether the rise of the top percentile was primarily a political or an economic phenomenon, thus they include a wide range of political and policy variables, such as dummies for the Golden Age era, the pre-Single European Act period, the political orientation of the government. The explanatory variables set also includes power resources variables like union density, the power of works councils, and centralisation of bargaining. Besides policy and power resources indicators, the estimations include economic and financialisation indicators, e.g. stock market capitalisation, the size of the financial sector, trade openness, outward FDI, economic growth, and top marginal tax rates. The results of six rounds of regressions based on the Prais-Winsten approach show that the most robust explanatory factors of the top percentile income share are the political orientation of the government, unionisation, power of works councils, bargaining centralisation, and stock market capitalisation. The election of right-wing governments indeed induces higher top income shares, while the decline of union membership and the de-centralisation of bargaining also contributed towards the same direction. With respect to financialisation, the positive impact of stock market capitalisation on the top one per cent provides support to the shareholder value orientation hypothesis that contends that managers' efforts to retain high the values of stock prices high and increase dividend payments benefits elite workers and capital owners which constitute this income share. In total, most statistically significant drivers of the top one per cent are power resources variables, which suggests that its rise is closely linked to indicators that capture the diminishing bargaining power of labour.

Table 1: Overview of related empirical studies

Authors	Dependent variable(s)	Financial variables	Data
Roine et al. (2009)	Top 0.1 per cent; Top10-1; bottom nine deciles	Banking and currency crises' dummies; Bank deposits; Stock market capitalisation; Total market capitalisation.	16 economies, 1900-2000
Volscho and Kelly (2012)	Top 1 per cent	S&P 500 Composite Index; Shiller Home Price Index	USA, 1949-2008
Dünhaupt (2014)	Top income shares, GINI	Stock market capitalisation; Net dividend payments	13 OECD countries, 1980-2010
Flaherty (2015)	Top 1 per cent	Domestic total credit volume; FIRE gross operating surplus; Financial globalisation; Market capitalisation; Banking sector liberalisation; Banking supervision; Financial reform index	14 OECD countries, 1990-2010
Godechot (2016)	Top income shares	Net distributed income; Household debt and household shares (share of GDP); Non-financial firms' financial income and assets (share of GDP)	18 advanced economies, 1970-2011
Huber et al. (2017)	Top 1 per cent	Stock market capitalisation; Size of the financial sector	18 advanced economies, 1960-2012

4. Econometric specification, data sources, and stylised facts

As shown above, the econometric studies that explore the effect of financialisation on the top one per cent either focus on the archetypal liberal market economy case study of the USA or utilise panel data analysis which potentially omits crucial country-specific information and does not allow comparative analysis. Aiming to provide a thorough comparative political economy perspective on the impact of neoliberalism, and more precisely the effect of financialisation, on the top one per cent this chapter focuses on four distinct varieties of capitalism focusing on four case study that represent four distinct varieties of capitalism in the neoliberal era: (i) the archetypal liberal market economy (LME) of the United States (1974-2011), whose growth in the late financialisation era was characterised by the housing asset market boom which ended with the collapse of 2007-8, sinking the economy into the deepest

recession since the Great Depression of the 1930's; (ii) the export-driven economy of Germany (1972-2010), a sector coordinated market economy also governed mostly by conservative governments whose growth regime in the neoliberal era is largely dependent on its exports (Stockhammer et al., 2016), i.e. trade globalisation; and (iii) the social-democratic nation coordinated market economy (NCME) of Sweden (1981-2012), a typical example of the Nordic model of capitalism during neoliberalism, i.e. a small open economy with an extensive welfare state and strong trade union institutions. This is the first study within the top one per cent econometric literature that examines individual case study other than the liberal US economy and the first comparative political economy inquiry on this subject. In order to provide a thorough assessment on the reasons behind the rise of the top one per cent income share in each case study, the estimations include a wide variety of explanatory variables that include mainly financialisation indicators, but also several power resources and trade globalisation variables. The econometric estimations are based on the unrestricted Error-Correction Model (UECM) (see Sargan 1964, Davidson et al. 1978), including a lagged dependent variable, in order to address potential serial correlation issues of a standard OLS regression in levels. This model includes both the short-run (first-differenced) and the long-run (level) effects of the independent variables. Pesaran and Shin (1999) argue that this parametrisation of the standard ECM model can efficiently estimate cointegrating (long-run) relationships among the variables, even if they are of different integration orders, i.e. I(0) and I(1). The inclusion of the lagged dependent variable allows limiting potential reverse causality issues, caused by serial correlation. The choice of this specification was based on a testing down procedure starting with a higher number of short-run lags (3) and decreasing them based on information criteria and R-squared values. This econometric specification is not new in the top one per cent literature as Volscho and Kelly (2012) use the same single-equation estimating strategy in their study of the US economy, while Godechot (2016) also utilises the same model but in a panel data context. Therefore, the baseline specification of the present study is of the following form:

$$\Delta(TOP1_t) = \alpha_0 + \alpha_1 TOP1_{t-1} + \alpha_2 WS_{t-1} + \alpha_3 GCONS_{t-1} + \alpha_4 UD_{t-1} +$$

$$\alpha_5 OPEN_{t-1} + \alpha_6 HHD_{t-1} + \alpha_7 BDEBT_{t-1} + \alpha_8 PS_{t-1} + \sum_{n=0}^{N} \beta_n \Delta z + \varepsilon_t \qquad (1)$$

Where $TOP1$ is the top one per cent income share, WS is the (adjusted) wage share, $GCONS$ is government consumption (as a share of GDP), UD is union density (% of labour force), $OPEN$ is trade openness (imports plus exports as a share of GDP), HHD is the household debt-to-

income ratio (as a share of GDP), $BDEBT$ is the business debt-to-income ratio (as a share of GDP), and PS the real share price index. Vector z includes short-run (first-differenced) effects of all variables, including the GDP growth in order to control for the short-run effects of the business cycle. The terms a_0 and ε_t are the constant and the error term, respectively.

The effect of the WS as a proxy for the potential impact of functional income inequality on personal income inequality and top income shares (Atkinson, 2009). This hypothesis is also tested by Flaherty (2015). The effect of WS on the $TOP1$ depends on the composition of the top percentile in each case. As suggested by Piketty (2014), during the neoliberal wage income still prevails over capital income even in the top one per cent, hence its effect could be even positive if elite workers income dominates. In cases which capital income prevails the effect of WS on $TOP1$ shall be negative, as redistribution towards wages decreases it. The effect of $GCONS$ on the $TOP1$ should be negative, as in principle state interventionism aims to empower labour and pursue a more egalitarian income distribution. Nevertheless, it is anticipated that its effect will be stronger in the cases of coordinated market economies, i.e. Germany and Sweden, where state interventionism is part of their policy regime. Regarding UD, its impact on the $TOP1$ shall be negative, as unions aim is to reduce income inequality. However, this relationship is not as straightforward as in the case of the functional income distribution, since the $TOP1$ include both wage and profit income. In principle, as in the case of $GCONS$, the positive effects of unionisation are expected to be stronger in the cases of coordinated economies. In particular, it is expected that the effects will be more dominant in the nation coordinated economy of Sweden, where union are relatively more powerful as bargaining takes place at the national level. This is not the case in Germany or the USA where bargaining takes place at the plant or the firm level, hence the effects shall be comparatively less strong. With respect to $OPEN$, trade openness, it is anticipated that it will exhibit a positive effect on income inequality, as it depicts enhanced capital mobility which shifts income distribution towards capital income. In addition, the size of the foreign sector in an economy represents how much it relies on its exports. As in our cases, their export sectors are mainly focused to high-quality products (e.g. cars in the case of Germany) it is expected that the orientation towards those sector benefits skilled workers instead of unskilled, hence wage inequality induces further the rise of top income shares. Following the country classification of Stockhammer et al. (2016) which suggests that Germany is a typical example of a heavily export-oriented economy, it is anticipated that the effect of $OPEN$ on its $TOP1$ will be more dominant compared to the other case study.

Moving on to the financialisation variables, the effect of HHD on the $TOP1$ is expected to be negative as the accumulation of household debt decreases the bargaining power of labour and induces redistribution towards capital through the debt service payments. Nonetheless, this might not be the case in statist-developmentalist economies (Schwarz and Seabrooke, 2008) where indebted homeowners are protected by the state. Therefore, as long as household indebtedness leads to the purchase of an asset (i.e. a residency) which eventually empowers workers position, the effect might well be even negative. A negative effect in Sweden would also be in line with the argument of Argitis and Dafermos (2013) who claim the disciplinary effects of household indebtedness depend on labour market institutions. Their argument suggests that in an economy with strong pro-labour market institutions workers may well demand higher wages to cover the debt service costs, which shall lead to lower income inequality. Regarding the impact of $BDEBT$ on the $TOP1$, this is expected to be positive as corporate financialisation induces redistribution from the productive sectors to the finance sector, increasing capital income from finance. As the top one per cent is the income share of rentiers and elite workers, it is expected to rise as financial rents increase. Last but not least, the third financial variable included in the baseline specification is PS, whose effect on $TOP1$ is also expected to positive, as it is a proxy for shareholder value orientation.[21] As managers endeavour to keep share prices high in order to maximise payments to shareholders and also keep their own wages high, higher income inequality is induced both in terms of elite employees' income and capital income, both of which are part of the top percentile.

Beyond the baseline specification, five additional specifications are estimated to evaluate the robustness of the main findings. In the second specification, the real short-term interest rate, INT, is included as a financial control variable. Its effect on the $TOP1$ shall be positive, since higher interest rates increase household and business debt service costs, inducing the redistribution of income towards higher income shares. In the third specification, stock market capitalisation, $SCAP$, replaces PS as an alternative measure of shareholder value orientation, which is also expected to increase the $TOP1$. In the fourth specification, $OPEN$ is replaced by the terms of trade, $TRADE$, as an alternative institutional variable for trade openness. Furthermore, the corporate tax rate, $CTAX$, is added in specification five in order to evaluate if taxation on capital income affects significantly top income shares. Finally, in the

[21] Admittedly, dividend payments would be a better proxy, as share prices also capture the financial bubble effect. However, the time horizon of dividend payments series is relatively short which would limit substantially the overall time horizon of the estimations to the post-1990's period.

last robustness specification TFP is added a rough proxy of technological progress, aiming to test the neoclassical argument that inequality is induced by skill differentials among workers due to technical progress, thus should exhibit a positive effect.

In the appendix can be found data sources and graphs, descriptive statistics, the results of the Augmented Dickey-Fuller (ADF) unit root tests, and the correlation matrices for all variables and countries. The outcome of the ADF unit root tests suggests that all variables for all four countries are either integrated of order zero or one, which justifies that the equations can be estimated through the standard UECM.

5. Econometric results

5.1 USA (1974-2011)

For the USA, in the baseline specification (1) UD, $GCONS$, HHD, $BDEBT$, and PS do have the anticipated signs in the long-run. Among those, the long-run coefficients of UD and PS are statistically significant at the 5 per cent level. Regarding the short-run, the two statistically significant coefficients are those of $BDEBT$ and PS (at the 5 and 1 per cent levels, respectively) and do have the expected positive signs. In specification (2), the results remain almost identical in terms of statistically significance and magnitude of the coefficients. UD has the anticipated negative long-run sign and is statistically significant at the 5 per cent level. The same holds for PS which keeps its positive sign in the short and the long-run, and in both cases remain statistically significant at the same levels with (1). In specification (3), where $SCAP$ replaces PS as an indicator for shareholder value orientation, the results change slightly. Here, the two statistically significant long-run coefficients are those of HHD and $SCAP$ at the 5 and 10 per cent levels, respectively, both having the expected positive signs. As with PS in the previous specifications, $SCAP$ also keeps its positive sign in the short-run and remains statistically significant at the 10 per cent level. In specification (4) in which OPEN is replaced by TRADE, the results also change slightly compared to the baseline specification. Now, all variables exhibit the anticipated signs in the long-run. Among them, the only statistically significant coefficients is that of UD at the 5 per cent level. In the short-run, BDEBT and PS are statistically significant at the 1 and 5 per cent levels, respectively, and both exhibit the expected signs as in (1). In specification (5) the long-run coefficients of UD, $BDEBT$, PS, and $CTAX$ are statistically significant at the 1 per cent level. The effects of UD, $BDEBT$, and PS do have the expected signs, but $CTAX$ exhibits a perverse sign, i.e. increase in corporate taxation induce

lower rather than higher income inequality. In the short-run, the coefficients of UD and $BDEBT$ keep their expected signs and also are statistically significant at the 1 per cent level. Finally, specification (6), where TFP is added as a control variable, provides evidence that UD and the three financialisation variables are the main drivers of the top percentile. UD and PS are statistically significant at the 1 per cent levels, whilst HHD and $BDEBT$ are statistically significant at the 10 per cent levels. All four variables exhibit the expected signs in the long-run. With respect to the short-run coefficients, once again, UD and PS are the two statistically significant ones, both keeping their anticipated negative and positive signs, respectively. In a nutshell, the LME of the United States has experienced a rapid increase in its top one per cent income share in the neoliberal era mainly due to the decline in unionisation and the financialisation of its economy. The main findings show that the impact of financialisation was multi-channel as both shareholder value orientation and private indebtedness have contributed positively. This is contrast with the findings for the SCME of Germany, where the impact of financialisation on the top percentile was through a single channel.

The econometric findings for the USA suggest that the two main long-run drivers of the top percentile in the neoliberal era have been union density and shareholder value orientation. The accumulation of household and corporate debt also seems to play a role to some extent. According to the Durbin-Watson (DW) test, none of the specifications faces issues of autocorrelation, thus we may conclude that the signs of the statistically significant long-run coefficients suggest strong cointegrating relations. The Breusch-Godfrey (BG) test also provides similar evidence for specifications (3), (4), (5), and (6), but not for (1) and (2).

Table 2: United States – Determinants of the top one per cent income share, 1974-2011

	(1)		(2)		(3)		(4)		(5)		(6)	
	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*
Long-run effects												
TOP(-1)	-1.504***	*-3.307*	-1.628***	*-3.277*	-1.146***	*-2.326*	-1.392***	*-3.240*	-1.866***	*-4.612*	-1.733***	*-3.394*
WS(-1)	0.342	*0.829*	0.314	*0.714*	-0.456	*-0.582*	0.418	*1.009*	0.634*	*1.750*	0.235	*0.574*
UD(-1)	-0.432**	*-2.264*	-0.472**	*-2.239*	0.504	*0.816*	-0.412**	*-2.230*	-0.915***	*-3.696*	-0.662***	*-2.716*
GCONS(-1)	-0.862	*-1.227*	-0.700	*-0.960*	-0.997	*-1.015*	-0.675	*-1.165*	-0.081	*-0.122*	-0.925	*-1.235*
OPEN(-1)	-0.224	*-0.596*	-0.280	*-0.725*	-0.465	*-0.754*			0.191	*0.551*	0.010	*0.026*
HHD(-1)	0.096	*1.394*	0.082	*1.081*	0.216**	*2.046*	0.089	*1.215*	-0.008	*-0.123*	0.128*	*1.824*
BDEBT(-1)	0.175	*1.668*	0.164	*1.530*	0.130	*0.936*	0.158	*1.390*	0.282***	*2.961*	0.205*	*1.811*
PS(-1)	0.078**	*1.992*	0.102**	*2.059*			0.055	*1.507*	0.087***	*2.592*	0.126***	*2.363*
INT(-1)			0.139	*0.615*								
SCAP(-1)					0.065*	*1.836*						
TRADE(-1)							0.027	*0.399*				
CTAX(-1)									2.037***	*2.910*		
TFP(-1)											-0.030	*-1.648*
C	0.034	*0.093*	0.065	*0.170*	0.387	*0.629*	-0.116	*-0.362*	-0.290	*-0.898*	0.378	*0.888*
Short-run effects												
Δ(TOP1(-1))	0.122	*0.526*	0.204	*0.813*	-0.136	*-0.457*	0.110	*0.484*	0.282	*1.296*	0.263	*1.051*
Δ(GROWTH)	0.000	*-0.165*	0.000	*-0.247*	0.000	*-0.686*	0.000	*0.211*	0.000	*1.064*	0.000	*0.583*
Δ(WS)	0.635	*1.359*	0.643	*1.353*	0.677	*1.023*	0.766	*1.678*	1.006***	*2.435*	0.688	*1.501*
Δ(UD)	-0.520	*-1.601*	-0.366	*-1.015*	0.970	*0.691*	-0.463	*-1.400*	-0.830***	*-2.840*	-0.627*	*-1.799*
Δ(GCONS)	-0.893	*-1.145*	-0.409	*-0.443*	-2.359	*-1.602*	-0.478	*-0.599*	-0.055	*-0.077*	-0.779	*-0.829*
Δ(OPEN)	-0.260	*-0.999*	-0.172	*-0.624*	0.020	*0.060*			-0.242	*-1.102*	-0.163	*-0.585*
Δ(HHD)	-0.125	*-0.632*	-0.126	*-0.627*	-0.102	*-0.432*	-0.035	*-0.284*	-0.020	*-0.109*	0.051	*0.227*
Δ(BDEBT)	0.342**	*2.008*	0.218	*0.922*	0.126	*0.367*	0.386***	*2.967*	0.572***	*3.496*	0.278	*1.592*
Δ(PS)	0.108***	*2.539*	0.113***	*2.488*			0.086**	*2.141*	0.044	*0.992*	0.098**	*2.326*
Δ(INT)			0.213	*1.180*								
Δ(SCAP)					0.045*	*1.774*						

Δ(TRADE)				0.080 *0.898*		
Δ(CTAX)					1.872** *2.164*	
Δ(TFP)						-0.022 *-0.586*
R^2	0.82	0.83	0.88	0.82	0.89	0.85
DW	2.34	2.45	2.14	2.29	2.20	2.33
BG	0.09	0.04	0.23	0.74	0.15	0.10

Notes: The dependent variable is the top one per cent income share in first differences. Statistical significance at 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

5.2 Germany (1972-2010)

In Germany, the long-run coefficients of UD, $GCONS$, $OPEN$, and HHD exhibit the anticipated signs in the baseline specification (1). Among those, the coefficients of UD, $GCONS$, and $OPEN$ are statistically significant at the 5, 10, and 1 per cent levels, respectively. It should be noted that the correct sign of $GCONS$ remains in the short-run as well, being statistically significant at the 5 per cent level. Regarding financialisation, the only statistically significant coefficient is that of PS which has a perverse long-run and an expected short-run sign, remaining statistically significant at the 1 and 10 per cent levels, respectively. In specification (2), in which INT is included, the results change slightly since now the only statistically significant long-run coefficients are the anticipated positive sign of $OPEN$ and the perverse sign of PS, both at the 1 per cent level. In the short-run, the impact of $GCONS$ remains negative as expected and is statistically significant at the 10 per cent level. In specification (3), where PS is replaced by $SCAP$, the results are similar to specification (1), as the statistically significant long-run coefficients are those of UD, $GCONS$, $OPEN$, and $SCAP$. The first three do keep the expected signs, but $SCAP$ has a perverse sign, like PS in (1). In the short-run, the coefficients of UD and $GCONS$ keep the correct signs and are statistically significant at the 5 and 10 per cent levels, respectively. The short-run coefficients of $SCAP$ has the expected positive sign and is statistically significant at the 5 per cent level, similar to PS in (1). In specification (4) where $TRADE$ replaces $OPEN$, the long-run estimators change moderately, since in this specification UD keeps the anticipated negative sign and PS the perverse negative sign, both statistically significant at the 1 per cent level. Moving on to specification (5), the results are almost identical to (1), as in the long-run UD, $GCONS$, $OPEN$, and PS are the only statistically significant coefficients, keeping the same signs. The same holds in the short-run where the only statistically significant estimates are those of $GCONS$ and PS which do have the anticipated signs. Ultimately, in the final specification (6) the addition of TFP does not alter substantially the findings. $GCONS$ and $OPEN$ keep their expected signs and are statistically significant at the 1 per cent level. PS also is again statistically significant at the 1 per cent level, still keeping a perverse sign in the long-run. In the short-term, the results remain similar to (1) and (5), since $GCONS$ and PS have the correct signs and are statistically significant at the 1 and 5 per cent levels, respectively. Overall, the results justify the characterisation of Germany as export-driven as the rise of its top one per cent can be attributed to trade globalisation, and to the decline in union density and government spending. The role

of financialisation is less clear as the impact of share prices alters between the short and the long-run.

As expected, in the export-driven, coordinated economy of Germany the effects of unionisation, trade globalisation, and government spending are robust. With respect to the effects of financialisation on the top one per cent income share in Germany, the estimations suggest that it is actually shareholder value orientation that matters both in the short and the long-run. Regarding post-estimation diagnostics, in five out of six estimations the Durbin-Watson and the Breusch-Godfrey tests suggest the absence of autocorrelation, hence those results are considered reliable. The absence of autocorrelation cannot be rejected only in specification (3). The absence of serial correlation suggests that indeed the statistically significant long-run coefficients depict strong cointegrating relationships.

Table 3: Germany – Determinants of the top one per cent income share, 1972-2010

	(1)		(2)		(3)		(4)		(5)		(6)	
	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*
Long-run effects												
TOP(-1)	-0.769***	*-3.991*	-0.602***	*-2.773*	-0.759***	*-3.644*	-0.401*	*-1.853*	-0.816***	*-3.991*	-0.630***	*-3.556*
WS(-1)	0.004	*0.053*	-0.016	*-0.213*	0.023	*0.290*	-0.003	*-0.032*	-0.025	*-0.305*	0.042	*0.476*
UD(-1)	-0.087**	*-2.033*	-0.041	*-0.809*	-0.091*	*-1.879*	-0.142***	*-2.728*	-0.098*	*-1.717*	-0.026	*-0.579*
GCONS(-1)	-0.245*	*-1.809*	-0.218	*-1.573*	-0.298*	*-1.712*	0.049	*0.390*	-0.274*	*-1.691*	-0.415***	*-2.843*
OPEN(-1)	0.086***	*2.909*	0.076***	*2.448*	0.058*	*1.736*			0.084*	*1.853*	0.085***	*2.907*
HHD(-1)	0.030	*0.931*	0.060	*1.633*	0.012	*0.309*	0.008	*0.194*	0.030	*0.859*	0.041	*1.420*
BDEBT(-1)	-0.052	*-0.822*	-0.066	*-1.056*	-0.006	*-0.082*	0.019	*0.263*	-0.037	*-0.483*	-0.092	*-1.524*
PS(-1)	-0.020***	*-3.267*	-0.023***	*-3.657*			-0.020***	*-2.560*	-0.021***	*-2.951*	-0.019***	*-2.844*
INT(-1)			-0.115	*-1.582*								
SCAP(-1)					-0.032**	*-2.085*						
TRADE(-1)							-0.004	*-0.173*				
CTAX(-1)									0.136	*0.301*		
TFP(-1)											0.004	*1.620*
C	0.142	*2.074*	0.119	*1.717*	0.137	*1.749*	0.080	*0.717*	0.169	*2.220*	0.099	*1.341*
Short-run effects												
Δ(TOP1(-1))	0.449***	*2.571*	0.314	*1.640*	0.541***	*2.879*	0.370*	*1.686*	0.463***	*2.550*	0.296*	*1.799*
Δ(GROWTH)	0.000*	*1.741*	0.000*	*1.738*	0.000	*0.801*	0.000	*0.075*	0.000*	*1.759*	0.000*	*1.760*
Δ(WS)	0.174	*1.612*	0.205*	*1.892*	0.229*	*1.863*	0.152	*1.118*	0.144	*1.208*	0.067	*0.601*
Δ(UD)	-0.053	*-0.762*	-0.048	*-0.689*	-0.161**	*-2.082*	-0.096	*-1.034*	-0.051	*-0.688*	0.039	*0.550*
Δ(GCONS)	-0.485**	*-2.218*	-0.442*	*-1.842*	-0.578*	*-1.934*	-0.197	*-0.781*	-0.475*	*-1.700*	-0.702***	*-2.945*
Δ(OPEN)	-0.038	*-1.204*	-0.033	*-1.037*	0.007	*0.213*			-0.037	*-1.055*	-0.005	*-0.136*
Δ(HHD)	-0.005	*-0.058*	-0.025	*-0.291*	-0.151	*-1.531*	-0.134	*-1.606*	0.015	*0.152*	0.007	*0.089*
Δ(BDEBT)	0.074	*1.090*	0.080	*1.193*	0.061	*0.847*	0.122	*1.434*	0.080	*1.117*	0.024	*0.388*
Δ(PS)	0.011*	*1.731*	0.008	*1.212*			0.006	*0.733*	0.011*	*1.690*	0.013**	*2.295*
Δ(INT)			-0.074	*-1.281*								
Δ(SCAP)					0.022**	*2.142*						

Δ(TRADE)				0.031	*0.992*	
Δ(CTAX)						-0.163 *-0.410*
Δ(TFP)						-0.014** *-2.079*
R^2	0.79	0.82	0.80	0.67	0.80	0.85
DW	2.25	2.48	2.98	2.46	2.12	2.12
BG	0.29	0.11	0.64	0.00	0.15	0.39

Notes: The dependent variable is the top one per cent income share in first differences. Statistical significance at 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

5.3 Sweden (1981-2012)

In the baseline specification (1) the three financial variables are statistically significant at the 1 per cent level, with $BDEBT$ and PS having the expected long-run signs and HHD having a perverse long-run sign. $GCONS$ and $OPEN$ also exhibit the anticipated signs, but they are statistically insignificant. The expected positive sign of PS also holds in the short-run where it is statistically significant at the 1 per cent level as well. In specification (2) incorporating INT yields almost identical results as the long-run coefficients of the three baseline financial variables remain unchanged in terms of signs and statistical significance. In this case the long-run coefficients of UD is borderline statistically significant at the 10 per cent level but has a perverse positive sign. Regarding the short-term, PS remains statistically significant at the 1 per cent level and keeps the correct positive sign. Replacing PS with $SCAP$ in specification (3) the picture changes substantially, since now the only statistically significant coefficient is that of $SCAP$ which does have the expected positive sign, both in the short and the long-run. The results also change in terms of statistical significance in specification (4), where all long-run variables are statistically significant at the 1 per cent level, except from $GCONS$. $BDEBT$ and PS do have the expected signs as in (1) and (2), while HHD keeps its perverse sign. Similar to the rest specifications the short run coefficient of PS has the anticipated sign and is statistically significant. As in (2), in (4) the sign of the long-run coefficient of UD remains perverse, i.e. increases the top one per cent. In specifications (5) and (6) incorporating $CTAX$ and TFP, respectively, does not provide us with different results as all coefficients remain almost identical to those of specification (1) and (2). In both $BDEBT$ and PS keep the expected positive signs and are statistically significant at the 1 per cent level. The long-run coefficients of HHD also remain statistically significant at the 1 per cent level, but also keep the perverse negative sign. As in most specifications PS keeps its correct sign in the short-run as well and is statistically significant at the 1 per cent level.

In Sweden, household indebtedness, corporate indebtedness, and share prices are the most robust drivers of the top one per cent income share in Sweden over the period 1981-2012. The long-run effects of corporate indebtedness and share prices do have the expected positive signs, but household debt appears to affect the top one per cent perversely, i.e. negatively. Evidently, increased levels of corporate debt and shareholder value orientation have led Swedish firms to worse financial positions, which are attempted to become improved by squeezing the income of the working class, leading to higher income inequality. In contrast,

the results suggest that the arguments of Froud et al. (2002) and Langley (2007) that accumulation of household debt should deteriorate the bargaining power of labour, leading to higher inequality, does not hold empirically. Why this is the case in the statist-developmentalist Sweden? As argued in the next section that might due to protected homeowners who might take advantage of debt accumulation in order to obtain assets as residential investment and improve their bargaining position in the long-run. Beyond the statistical significance of the coefficients, the Durbin-Watson and the Breusch-Godfrey tests suggest that the residuals are not autocorrelated in the cases of specifications (1), (2), (4), and (6), whilst the issue of positive autocorrelation arises in the rest, hence the results of the former are considered as most reliable in terms of depicting cointegrating long-run relationships.

Table 4: Sweden – Determinants of the top one per cent income share, 1981-2012

	(1)		(2)		(3)		(4)		(5)		(6)	
	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*	Coeff	*t-stat*
Long-run effects												
TOP(-1)	-1.996***	*-5.905*	-2.122***	*-4.458*	-0.778	*-1.635*	-2.219***	*-7.547*	-1.928***	*-5.028*	-2.036***	*-5.501*
WS(-1)	0.268**	*2.091*	0.309	*1.666*	-0.272	*-0.723*	0.205***	*3.216*	0.254*	*1.779*	0.271*	*1.686*
UD(-1)	0.131	*1.401*	0.164*	*1.694*	-0.278	*-1.574*	0.141***	*2.529*	0.151	*1.125*	0.142	*1.265*
GCONS(-1)	-0.142	*-0.711*	0.063	*0.262*	0.285	*0.569*	-0.230	*-1.451*	-0.141	*-0.676*	-0.066	*-0.235*
OPEN(-1)	0.074	*1.145*	0.062	*0.866*	-0.227	*-1.453*			0.089	*1.092*	0.069	*0.864*
HHD(-1)	-0.114***	*-2.987*	-0.110***	*-2.730*	0.032	*0.235*	-0.142***	*-4.631*	-0.095**	*-2.079*	-0.114***	*-2.633*
BDEBT(-1)	0.051***	*3.284*	0.047***	*2.702*	0.009	*0.209*	0.062***	*4.454*	0.042**	*2.278*	0.050***	*2.957*
PS(-1)	0.097***	*4.778*	0.110***	*3.839*			0.108***	*6.101*	0.095***	*3.657*	0.096***	*4.448*
INT(-1)			-0.082	*-0.470*								
SCAP(-1)					0.073***	*2.951*						
TRADE(-1)							-0.127***	*-2.731*				
CTAX(-1)									-0.049	*-0.057*		
TFP(-1)											0.002	*0.700*
C	-0.197	*-0.888*	-0.289	*-1.185*	0.478	*1.073*	0.063	*0.675*	-0.219	*-0.839*	-0.241	*-0.813*
Short-run effects												
Δ(TOP1(-1))	0.397**	*2.216*	0.336*	*1.707*	-0.110	*-0.321*	0.516***	*3.231*	0.417**	*2.052*	0.423**	*2.125*
Δ(GROWTH)	0.000	*-0.288*	0.000	*-0.231*	0.000	*0.408*	0.000	*0.463*	0.000	*0.192*	0.000	*-0.154*
Δ(WS)	0.098	*0.888*	0.110	*0.910*	0.045	*0.173*	0.121	*1.498*	0.123	*1.042*	0.124	*0.872*
Δ(UD)	0.196	*1.677*	0.128	*1.006*	-0.164	*-0.728*	0.188***	*2.446*	0.225*	*1.770*	0.198	*1.538*
Δ(GCONS)	0.094	*0.352*	0.212	*0.731*	-0.177	*-0.209*	0.130	*0.603*	0.269	*0.782*	0.075	*0.259*
Δ(OPEN)	0.044	*0.923*	0.047	*0.945*	-0.087	*-0.816*			0.056	*1.008*	0.032	*0.599*
Δ(HHD)	-0.018	*-0.370*	0.035	*0.626*	-0.026	*-0.207*	-0.009	*-0.213*	-0.042	*-0.557*	-0.026	*-0.452*
Δ(BDEBT)	0.004	*0.176*	0.003	*0.138*	-0.082	*-0.922*	0.016	*0.889*	0.002	*0.103*	0.009	*0.302*
Δ(PS)	0.067***	*6.925*	0.071***	*5.950*			0.067***	*8.176*	0.058***	*3.129*	0.064***	*5.758*
Δ(INT)			0.016	*0.141*								
Δ(SCAP)					0.029**	*2.099*						

Δ(TRADE)				-0.051	*-1.074*	
Δ(CTAX)						0.378 *0.551*
Δ(TFP)						0.002 *0.153*
R^2	0.90	0.92	0.94	0.93	0.90	0.90
DW	2.43	2.36	2.56	2.60	2.71	2.42
BG	0.20	0.14	0.01	0.16	0.03	0.11

Notes: The dependent variable is the top one per cent income share in first differences. Statistical significance at 10%, 5%, and 1% level is denoted by *, **, and ***, respectively.

6. The Comparative Political Economy of the Top 1% in the neoliberal era

The main results above do provide us with important information on which are the main drivers of the top percentile in the short and the long-run in each case study. However, the magnitudes of the coefficients obtained are not comparable either within each country or cross country. To make the coefficients comparable it is necessary to derive the standardised coefficients by multiplying the estimated coefficient by the ratio of the standard deviation of the explanatory variable over the standard deviation of the dependent variable. According to Ziliak and McCloskey (2004), this step is essential in every econometric study that seeks to evaluate the socio-economic significance of the relative effects and go beyond statistical significance. Table 6 below reports the standardised coefficients of the long-run, cointegration effects for the baseline specifications (1) for the United States, Germany, and Sweden.[22]

Table 6: Standardised long-run coefficients

	United States	Germany	Sweden
WS(-1)	0.326	0.019	0.832
UD(-1)	-1.216	-0.884	0.826
GCONS(-1)	-0.547	-0.774	-0.166
OPEN(-1)	-0.630	2.089	1.032
HHD(-1)	1.135	0.569	-1.243
BDEBT(-1)	0.755	-0.378	1.646
PS(-1)	2.120	-1.355	3.999

Notes: Calculations are based on the baseline specification (1).

Starting with the case study of the USA also yields interesting results. As in Sweden, both in the short and the long-run the impact of PS on the $TOP1$ is indeed positive and dominates the rest coefficients. This result provides further support to the argument of Lazonick and O'Sullivan (2000) that pursuing increases in share prices increases the top one per cent by raising the dividend and interest payments, along with the income of highly skilled employees. This result is also in line with the classical VoC classification of the USA as a liberal asset-based market economy, which implies that in principle asset prices should affect more macroeconomic outcomes, including income inequality. Focusing on the long-run, the second dominant driver of the top one per cent in the USA during the neoliberal era is union membership, UD. As in the case of Germany, its effect is indeed negative as expected. This finding underlines that the rise of the top one per cent in the USA since the mid-1970's is also strongly induced by the declining unionisation rates, i.e. the disempowerment of labour's

[22] The standardized coefficients are calculated as follows. The estimated coefficient obtained is multiplied by the ratio of the standard deviation of the explanatory variable over the standard deviation of the dependent variable.

representation which aims to reduce inequalities. In the short-run, the second strongest and statistically significant variables is the corporate debt ratio, $BDEBT$. This translates to higher income inequality in the short-run due to the rise of corporate financialisation, i.e. the redistribution of income towards the rentier class during neoliberalism.

In the case of the export-driven German economy, as expected based on the country classification of Stockhammer et al. (2016), the long-run coefficient of $OPEN$ exhibits clearly the strongest effect on the $TOP1$ during the neoliberal era. This means that indeed the rise of the top percentile in Germany has to do mainly with the rise of a social class that benefited disproportionately from the export-oriented strategy of the country. The second strongest long-run effect is that of PS which has a perverse negative effect on the top income share. One possible explanation for this perverse sign is that even members of the lower working class had access to buy shares providing them additional sources of income from capital, increasing indirectly their bargaining power, thus eventually leading to lower inequality. Consequently, future studies should look at the ownership of stocks, as it is of great significance for their potential effects on income distribution. Yet, this task is non-trivial, thus it is beyond the scope of this study. It should be noted though, that PS leads to higher income inequality in Germany, but the effects are limited only to the short-run. The other significant variables as expected for a coordinated economy are the long-run effects of UD and $GCONS$, which show that the rise of the top percentile in Germany has also been induced by falling unionisation and welfare state retrenchment during neoliberalism. Interestingly, $GCONS$ also has a negative effect in the short-run which highlights the importance of welfare state retrenchment for top income shares in this case. In total, for Germany, it seems that it is primarily the power resources variables and trade globalisation that matter more for the growth of the top percentile rather than financialisation. This is to some extent expected for a coordinated economy, as in theory, financialisation should be more dominant in liberal regimes.

Lastly, standardizing the coefficients for the case of Sweden, the standardised coefficients suggest that both in the short and the long-run the positive impact of PS on the $TOP1$ is dominant. This results provides strong empirical support to the view that the Swedish top percentile income share rose mainly due to the rise of shareholder value orientation during neoliberalism. As proposed by Lazonick and O'Sullivan (2000) this implies that Swedish firms' attempts to boost share prices indeed assisted the rise of a social group of elite workers and capital owners whose income is linked to dividend payments. This could be to some extent surprising as coordinated economies are in principle credit-based, thus debt aggregates should

dominate. Beyond shareholder value orientation, the second dominant effect is indeed the positive long-run impact of $BDEBT$ on the $TOP1$. This shows that the second main factor that induced the rise of the top one per cent in Sweden was the redistribution of income from the productive firms to the rentier class, through corporate debt payments. As rentiers are still a vital part of the top income shares this resulted in an increase in the top percentile. Regarding the third main financialisation variable HHD the interpretation of its negative and statistically significant long-run sign is not straightforward. As suggested earlier, there are two possible explanation behind this negative effect. The first comes from the Neo-Weberian literature on welfare state and financialisation regimes. Schwarz and Seabrooke (2008) classify Sweden as a statist-developmentalist, coordinated economy, in which the state protects the right to home ownership with a focus on indebted homeowners who are more vulnerable financially. This means that indebtedness in this case does not have the disciplinary effects on labour's bargaining power that are expected by Froud et al. (2002) and Langley (2007). In contrast, as indebtedness leads to the purchase of an asset for the indebted homeowner, i.e. the residency, this eventually empowers his/her bargaining position, hence the long-run negative effect. A second potential explanation is that the strong pro-labour market institutions in Sweden give workers the power to demand higher wages in order to cover their debt commitments, ultimately reducing income inequality, as proposed by Argitis and Dafermos (2013). Overall, it is quite interesting that, even in Sweden which is a nation coordinated economy, the power resources variables are insignificant, and the impact of financialisation is clearly dominant. That probably has to do with the fact that power resources variables play a relatively more important and straightforward role for functional income distribution, and not top income shares which are constituted of wage and capital income.

Centring on the cross-country discrepancies, we observe the positive impact of shareholder value orientation on the top percentile is robust in two out of the three countries. This holds unanimously in the short and the long-run in Sweden and the USA, where rising share prices lead to increases in the top one per cent. The impact of the real share price index is less clear in the case of Germany since it induces higher income inequality only in the short-run. The impact of other financialisation variables becomes evident mainly in Sweden where both private aggregates have significant long-run effects. For the USA corporate indebtedness also seems to play a role, but it is limited to the short-run only. With respect to the rest explanatory variables, the significance of the direct measures of power resources varies substantially. UD is the most prominent power resource variable, as the decline of union

membership is statistically significant and has a substantially large magnitude both for Germany and the USA. Contrariwise, the decline in government spending, i.e. welfare state retrenchment, is important to the top one per cent only in the case of Germany, both in the short and the long-run. Summarising, it can be argued that the rise of the top one per cent income share in the neoliberal era was mainly a phenomenon driven by financialisation, rather than by power resources indicators. Power resources variables which are more strictly linked to the bargaining process over the determination of factor income shares seem to be relatively more influential for the wage share decline in the neoliberal era (e.g. see Kristal, 2010; Hancke, 2012; Bengtsson, 2014).

7. Conclusions

Within the broad distribution literature several empirical studies explore the determinants of functional income distribution with a focus on the impact of financialisation provide evidence that rising household indebtedness (Guschanski and Onaran, 2018; Wood, 2017), shareholder value orientation (Lin and Tomaskovic-Devey, 2013; Alvarez, 2015; Dünhaupt, 2017; Köhler et al., 2018), and financial globalisation (Stockhammer, 2017) have decreased the labour share. The goal of the present chapter has been to go beyond functional income distribution and explore the determinants of the top one per cent income share in the neoliberal era focusing on the individual country level through a comparative political economy approach. This study is the first attempt to provide such a comparative analysis focusing primarily on the impact of financialisation. Also, it is the first time that any individual country study within this part of the empirical literature explores other case studies except the liberal market economy of the USA. A substantially smaller proportion of the distribution literature has focused on the determinants of the top one per cent, including the effects of financialisation. The main findings of those studies show that higher income inequality is induced by the expansion of certain activities of the financial sector, either based on panel data context (Roine et al., 2009; Dünhaupt, 2014; Flaherty, 2015; Godechot, 2016; Huber et al. 2017) or focusing on the case of the USA (Volscho and Kelly, 2012). The common empirical result in most of these studies is that the main financial variables that affect the top one per cent income share are shareholder value orientation (measured by share prices, stock market capitalisation, or dividend payments) and the size of the financial sector. Both factors are found to lead to higher top income shares. With the exception of Godechot (2016), none of these studies estimates the effects of household and corporate financialisation in terms of private indebtedness, despite several studies have

explored those channels (e.g. Froud et al., 2002; Langley, 2007; Argitis and Dafermos, 2013; Kim et al., 2017; Wood, 2017).

The main contribution of this present chapter is that it examined econometrically three coordinated market economies with diverse characteristics, besides the USA (1974-2011): Germany (1972-2010), an export-driven, sector coordinated economy whose growth during neoliberalism has been mainly dependent on exports (Stockhammer et al. 2016); Sweden (1981-2012), an example of a nation coordinated market economy with a statist-developmentalist tradition to protect homeownership, including the indebted households (Schwarz and Seabrooke, 2008). The explanatory variables include a wide variety of factors including power resources indicators like union density, government spending, trade openness, terms of trade, and financialisation indicators such as the corporate and household debt ratios, and real share prices. Other control variables include stock market capitalisation as an alternative measure of shareholder value orientation, the corporate tax rate, and total factor productivity per hour worked as a rough technical progress indicator.

The econometric results for the USA (1974-2011) suggest that the three main factors that led to the explosive growth of its top one per cent have been the fall in union membership, rising share prices, and to some extent corporate financialisation. Rising share prices, i.e. shareholder value orientation, dominate the other effects both in the short and the long-run and do increase the top income share as expected according to Lazonick and O'Sullivan (2000). Declining unionisation is the second robust long-run effect which indeed suggests that the erosion of trade unions in the post-Fordist era favoured capital income and elite workers, resulting in rapidly rising top income shares. In the short-run, it seems that redistribution from productive units towards rentiers through corporate debt also induced higher income inequality to some extent. The estimations for the German economy (1972-2010) provide evidence which is in line with its classification as an export-driven economy (Stockhammer et al. 2016), as the long-run effect of trade openness indeed induces increases in the top one per cent, whereas government spending and unionisation have opposite effects. With respect to financialisation, similar to most existing studies, the only robust indicators are the proxies of shareholder value orientation, i.e. share prices and stock market capitalisation, both of which increase the top one per cent as they are associated with increases in capital income. This holds both in the short and the long-run, highlighting the robustness of the positive effects. Regarding the statist-developmentalist, coordinated economy of Sweden (1981-2012), the econometric findings underline that financialisation has been the main driver of its top one per cent in the neoliberal

era. This becomes evident as the long-run coefficients of all three main financial variables are statistically significant in almost all six specifications. The corporate debt ratio, real share prices, and stock market capitalisation increase the top one per cent, pinpointing that corporate financialisation and shareholder value maximisation ideology induces redistribution of income towards rentiers and elite workers, i.e. top income shares. The negative effect of household debt is in contrast with the cultural political economy argument (Froud et al., 2002; Langley, 2007) which links financialisation with the decreased bargaining power of labour but justifies the classification of Sweden as statist-developmentalist by Schwarz and Seabrooke (2008). As in such an economy, indebted homeowners are protected by the state household debt does not have disciplinary wage income effects, since the fear of defaulting on their debt is minimised. The mortgage leads to the purchase of an asset for the working class and eventually empowers it as a residency constitutes part of household wealth, thus the long-run negative effect on the top one per cent.

Summarising the empirical findings for the four case studies in comparative perspective, the effect of financialisation is robust in all three countries, whilst the effects of power resources are not statistically significant in all cases. The positive effect of shareholder value orientation on the top percentile income share is most robust financialisation indicator, since this finding holds for Germany, Sweden, and the USA, either in the context of real share prices or in the context of stock market capitalisation. This result is in line with the existing empirical literature on the top one per cent (Roine et al., 2009; Dünhaupt, 2014; Flaherty, 2015; Godechot, 2016; Huber et al. 2017) which shows that its primary driver is indeed shareholder value orientation. The main new result here is that the present study provides such evidence for Germany and Sweden, and not only for the USA. Furthermore, the second important finding regarding financialisation is the statistically significant effects of the private debt ratios in Sweden and the USA, whose economic significance is discussed thoroughly earlier. These results are also consistent with the panel data study of Godechot (2016), who also shows that the rise in the private debt ratios has induced higher top income shares in the neoliberal period. Beyond financialisation, the effects of trade globalisation are quite limited in all cases except from Germany, which was expected based on the experience of the export-oriented strategy of its economy in the last few decades (Stockhammer et al. 2016). With respect to the power resources variables it seems that they play a more important role for the coordinated market economy of Germany, and to some extent for the liberal market economy of the USA. Interestingly, in Sweden, the effects are limited only to unionisation, despite its long tradition

of social democracy. These mixed results suggest that power resources variables are probably more closely related to the conflict over the functional distribution of income rather than to top income shares. Overall, the results show that the rise of the top one per cent during the neoliberal era has been a phenomenon driven by different factors, but financialisation seems to be the key factor in all three countries. The impacts of financialisation in the form of stock price inflation is consistent, the effects of private indebtedness, trade globalisation, welfare state retrenchment, and declining unionisation seem to depend on domestic characteristics of the economy. Such an example is the protectionist behaviour of the Swedish state in favour of indebted homeowners.

Future research shall focus on providing more thorough comparative political economy studies on income distribution. As this study shows significant cross-country variation exists in its results, which unveils institutional and cultural differences among the case studies. So far, most studies utilise panel data analysis or focus exclusively on the USA, leaving unexplored a wide variety of countries who have experienced a rapid rise in their top one per cent income share. In addition, from a critical realist perspective future research should develop more thoroughly the channels through which financialisation affects income distribution. In this direction, it is of great significance to distinguish between measures of inequality that represent different social groups, i.e. functional income distribution versus top income shares. As shown in the previous chapter, private debt aggregates are found to be influential for functional income distribution, but this chapter shows that it is shareholder value orientation that matters more for the top one per cent. By the same token, power resources theory should update its benchmark framework by distinguishing between different channels that may affect different inequality indicators, since variables like government spending and union density are found to be dominant only in the context of the functional income distribution.

Appendix

A1: Descriptive statistics, ADF results, and correlation matrices

Table A1: Descriptive statistics and ADF unit root tests

	TOP1	WS	GROWTH	UD	GCONS	OPEN	HHD	BDEBT	PS	INT	SCAP	TFP	TRADE	CTAX
Germany														
Mean	0.11	0.72	824.04	0.29	0.21	0.55	0.55	0.52	0.55	0.05	0.31	8.58	0.97	0.02
Median	0.11	0.72	721.92	0.32	0.22	0.46	0.54	0.52	0.44	0.04	0.27	8.69	0.99	0.02
Max	0.15	0.76	2193.89	0.36	0.24	0.87	0.71	0.61	1.58	0.12	0.65	11.34	1.04	0.03
Min	0.09	0.65	-892.29	0.17	0.17	0.31	0.36	0.44	0.12	0.00	0.08	4.78	0.83	0.00
Obs	50	43	47	57	58	48	48	48	57	57	43	53	48	52
ADF levels	0.72	0.40	0.69	0.02	0.98	0.99	0.75	0.88	0.89	0.24	0.69	0.11	0.25	0.02
ADF diff	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sweden														
Mean	0.07	0.70	85.48	0.76	0.24	0.69	0.59	1.05	0.38	0.06	0.49	8.20	1.10	0.02
Median	0.07	0.69	75.00	0.76	0.25	0.65	0.53	1.02	0.16	0.04	0.39	7.93	1.09	0.02
Max	0.11	0.78	331.12	0.87	0.28	0.93	0.88	1.58	1.59	0.14	1.38	10.96	1.34	0.04
Min	0.04	0.64	-172.30	0.65	0.16	0.43	0.44	0.54	0.01	-0.01	0.03	5.24	0.99	0.01
Obs	54	43	57	53	58	48	38	38	57	35	29	53	48	52
ADF levels	0.69	0.41	0.64	0.67	0.90	0.93	0.95	0.98	0.97	0.29	0.74	0.99	0.06	0.31
ADF diff	0	0	0	0	0	0	0	0	0	0	0	0	0	0
USA														
Mean	0.14	0.67	3896.74	0.15	0.16	0.21	0.62	0.57	0.47	0.01	0.99	9.44	1.07	0.02
Median	0.13	0.68	3556.90	0.14	0.16	0.20	0.59	0.56	0.24	0.01	1.03	9.30	1.04	0.02
Max	0.23	0.70	8187.98	0.24	0.18	0.31	0.98	0.74	1.48	0.06	1.66	11.84	1.47	0.04
Min	0.08	0.64	-2998.43	0.10	0.14	0.11	0.41	0.37	0.05	-0.02	0.39	6.68	0.95	0.01
Obs	56	42	47	44	57	47	58	58	57	52	38	53	47	52
ADF levels	0.91	0.12	0.28	0	0.48	0.92	0.82	0.97	0.99	0.02	0.85	0.99	0.04	0
ADF diff	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Notes: ADF levels is the Augmented Dickey-Fuller test for stationarity in levels, while ADF diff is the same test in first differences. P-values are reported for this test.

Table A2: Correlation matrices

	$TOP1$	WS	$GROWTH$	UD	$GCONS$	$OPEN$	HHD	$BDEBT$	PS	INT	$SCAP$	TFP	$TRADE$	$CTAX$
Germany														
$TOP1$	1													
WS	-0.78	1												
$GROWTH$	0.39	-0.47	1											
$GCONS$	-0.77	0.83	-0.23	1										
UD	0.28	-0.61	-0.06	-0.64	1									
$OPEN$	0.87	-0.86	0.39	-0.92	0.56	1								
HHD	0.43	-0.68	0.13	-0.79	0.76	0.66	1							
$BDEBT$	0.52	-0.58	0.08	-0.83	0.62	0.78	0.81	1						
PS	0.70	-0.81	0.35	-0.88	0.57	0.82	0.83	0.73	1					
INT	-0.44	0.49	0.09	0.67	-0.40	-0.51	-0.52	-0.44	-0.52	1				
$SCAP$	0.66	-0.71	0.29	-0.82	0.51	0.74	0.85	0.72	0.94	-0.58	1			
TFP	0.62	-0.87	0.31	-0.89	0.74	0.82	0.86	0.79	0.89	-0.46	0.81	1		
$TRADE$	0.37	-0.54	0.04	-0.66	0.42	0.40	0.61	0.45	0.64	-0.64	0.63	0.71	1	
$CTAX$	0.22	0.07	0.19	0.31	-0.40	-0.09	-0.43	-0.48	-0.23	0.19	-0.21	-0.42	-0.51	1
Sweden														
$TOP1$	1													
WS	-0.48	1												
$GROWTH$	0.50	-0.56	1											
$GCONS$	-0.22	-0.02	-0.13	1										
UD	-0.26	0.21	-0.48	0.12	1									
$OPEN$	0.73	-0.73	0.56	-0.53	-0.31	1								
HHD	-0.32	0.66	-0.21	-0.05	-0.34	-0.47	1							
$BDEBT$	0.76	-0.12	0.09	-0.05	-0.16	0.38	0.07	1						
PS	0.96	-0.54	0.55	-0.35	-0.38	0.84	-0.30	0.70	1					
INT	-0.83	0.70	-0.40	0.25	0.27	-0.83	0.35	-0.62	-0.85	1				
$SCAP$	0.90	-0.69	0.56	-0.21	-0.41	0.81	-0.37	0.61	0.93	-0.89	1			
TFP	0.84	-0.50	0.36	-0.45	-0.30	0.80	-0.17	0.77	0.87	-0.89	0.81	1		
$TRADE$	-0.45	0.40	-0.24	0.67	-0.20	-0.77	0.37	-0.23	-0.52	0.55	-0.40	-0.61	1	
$CTAX$	0.78	-0.71	0.66	0.00	-0.52	0.72	-0.34	0.43	0.82	-0.80	0.86	0.64	-0.25	1
USA														
$TOP1$	1													
WS	-0.77	1												
$GROWTH$	0.53	-0.34	1											
$GCONS$	-0.90	0.78	-0.37	1										
UD	-0.35	-0.06	-0.52	0.24	1									

OPEN	0.83	-0.85	0.38	-0.79	-0.10	1								
HHD	0.87	-0.86	0.30	-0.88	0.01	0.87	1							
BDEBT	0.68	-0.65	0.00	-0.68	0.17	0.59	0.73	1						
PS	0.95	-0.83	0.46	-0.88	-0.28	0.92	0.92	0.66	1					
INT	-0.43	0.48	-0.15	0.56	-0.19	-0.66	-0.66	-0.34	-0.56	1				
SCAP	0.87	-0.60	0.55	-0.80	-0.60	0.69	0.70	0.38	0.86	-0.37	1			
TFP	0.90	-0.86	0.37	-0.93	-0.16	0.90	0.96	0.69	0.96	-0.67	0.81	1		
TRADE	0.10	0.06	0.16	-0.14	-0.46	-0.32	-0.12	-0.01	0.01	0.37	0.29	0.00	1	
CTAX	0.22	-0.02	0.57	0.02	-0.47	0.15	0.04	-0.26	0.12	0.09	0.26	-0.01	-0.25	1

A2: Data sources and graphs

Table A3: Data sources and definitions

Indicator	**Measure**	**Source**	**Notes**
$TOP1$	Top 1% income share (% GDP)	wid.world	
GDP	USD, Millions	OECD	
X	% GDP	OECD	
M	% GDP	OECD	
WS	% GDP	OECD	
$TRADE$	Exports price index over imports price index	OECD	
$GOVC$	% GDP	WORLD BANK	
UD	% total number of employees	OECD	Administrative data for all countries except from the USA
HHD	% GDP	BIS	
$BUSD$	% GDP	BIS	
PS	Index, Real	OECD	
INT	%, Nominal	OECD	
$INFL$	%	OECD	
$CTAX$	%	WORLD BANK	
TFP	TFP per hour worked	Bergeaud et al. (2016)	

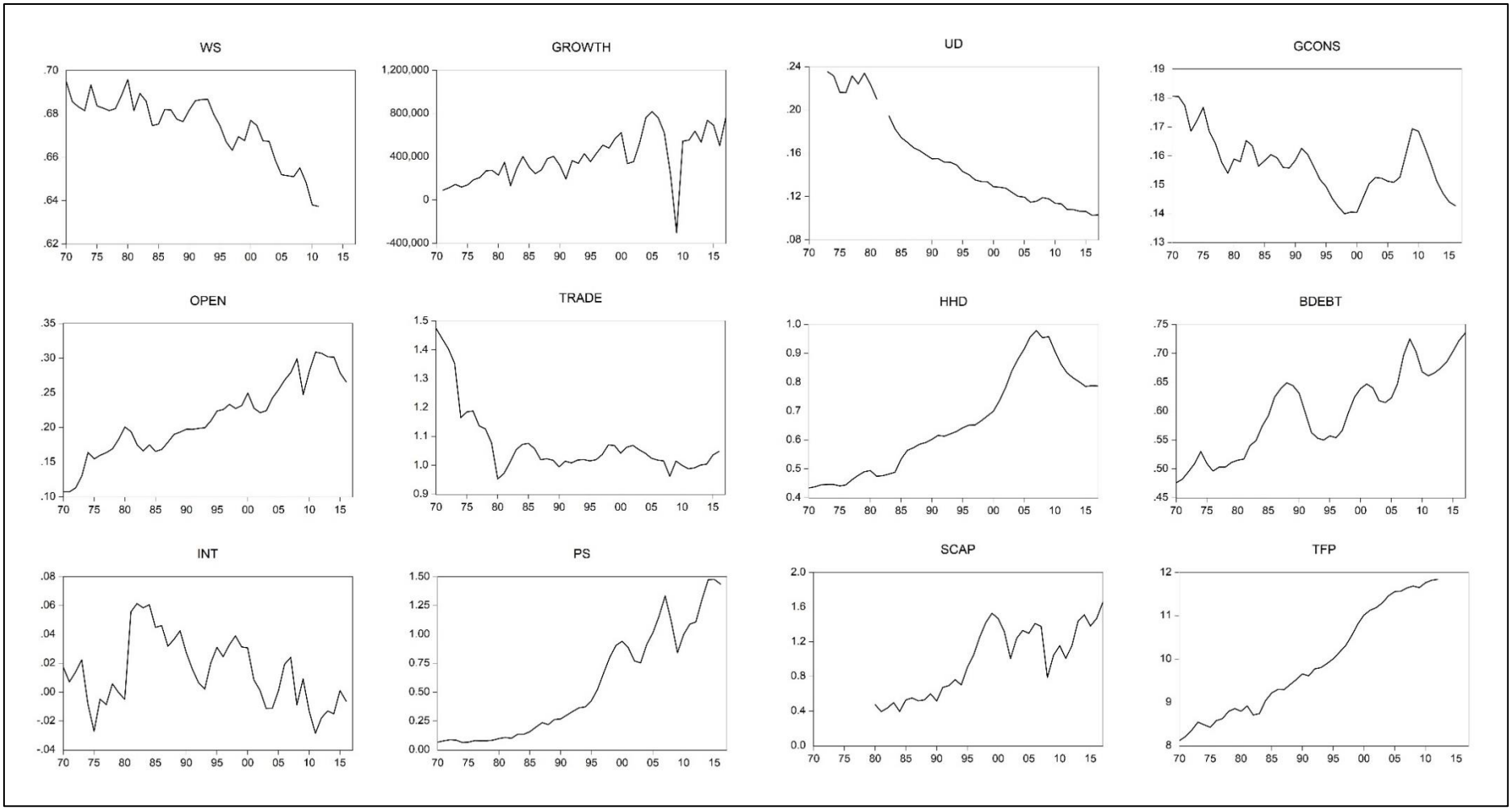

Figure A1: USA – Explanatory variables

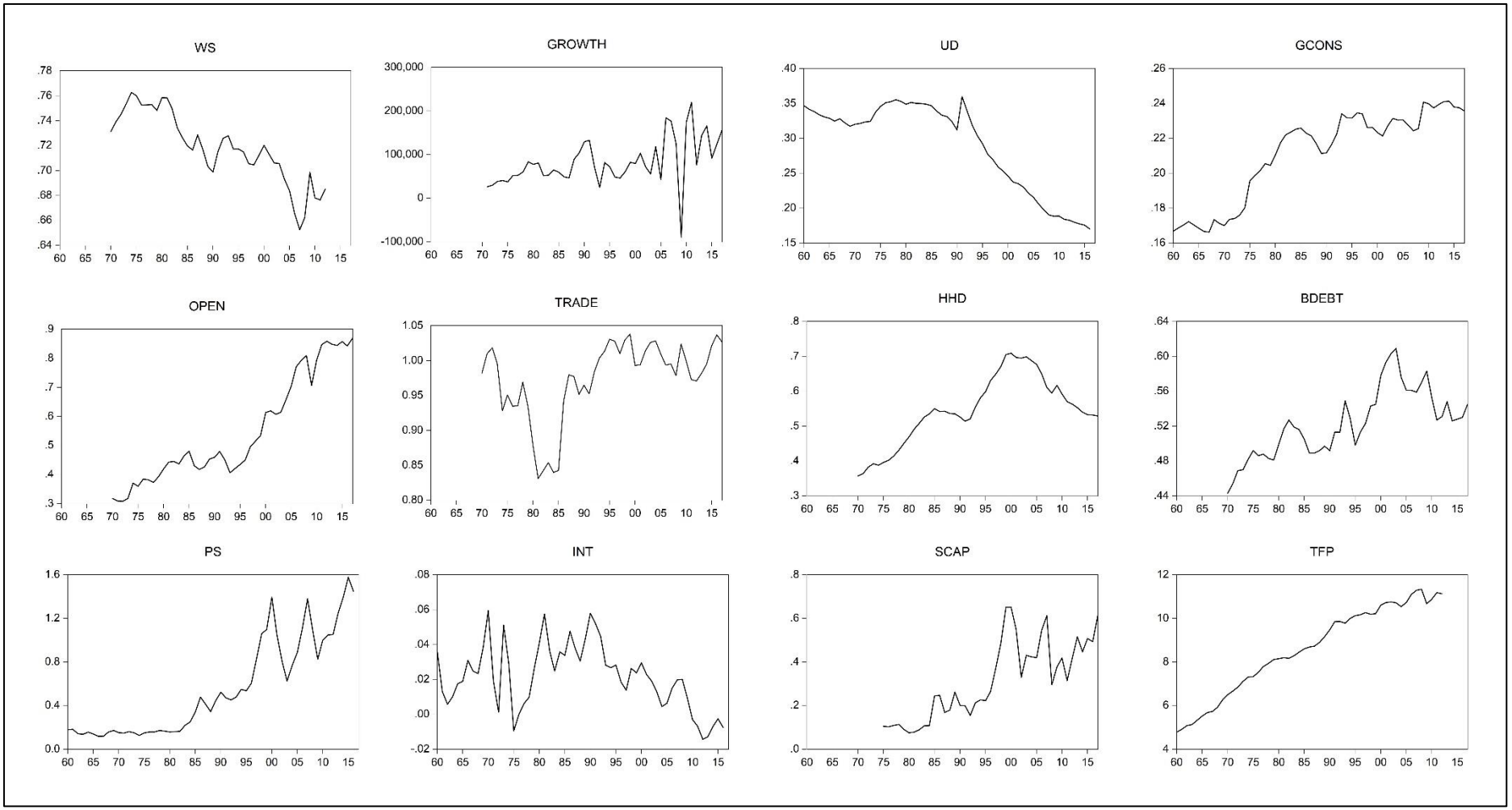

Figure A2: Germany – Explanatory variables

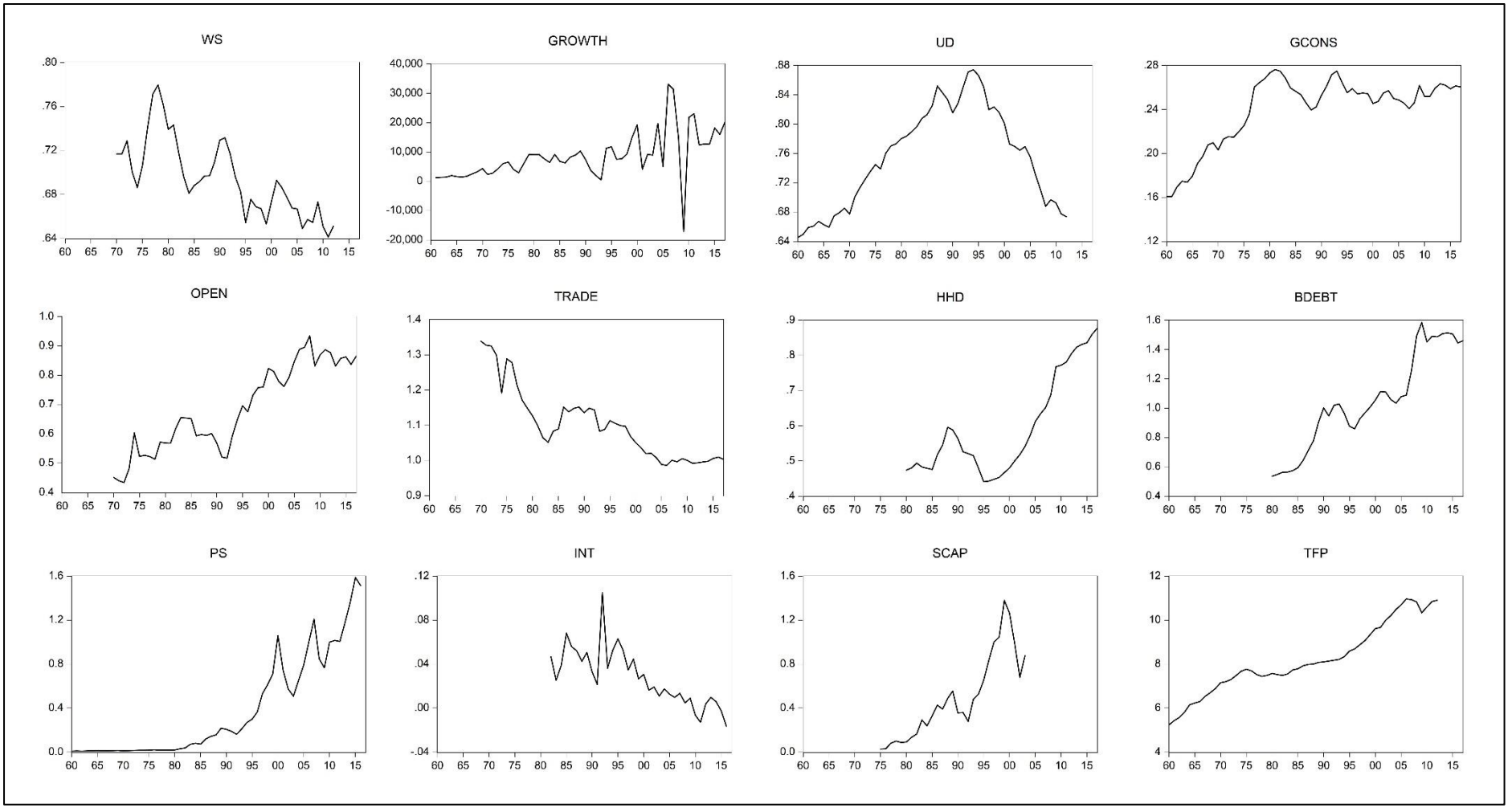

Figure A3: Sweden – Explanatory variables

Conclusions

The goal of this doctoral research project has been to contribute to the growing empirical political economy literature on the macroeconomic effects of financialisation, understanding this phenomenon as integral to capitalism, and not only as part of the neoliberal era. Focusing on both broad research areas of the financialisation scholarship, i.e. its impact on economic fluctuations and its effects on income inequality, the first two chapters of this dissertation utilised historical macroeconomic data to explore whether finance has been influencing business cycles and functional income inequality since the mid-19th century, following a comparative political economy approach. Scrutinising further the impact of financialisation on income distribution, the third chapter centred on personal income inequality, and more precisely on the top one per cent incomes share. However, the econometric exploration of this chapter focuses on the neoliberal era. The choice to shift the focus of the third chapter on a specific period, rather than use historical macroeconomic data, is based on Piketty's (2014) decomposition analysis of top income shares. Piketty's findings show that the top percentile has changed dramatically compared to the pre-WWII period, since in neoliberalism it includes both top managers and rentiers (i.e. wage and profit incomes), rather than exclusively rentiers (i.e. only profit income). In this respect, examining the determinants of this particular inequality indicator over a long historical period can lead to misleading results. This is unlike the wage or the profit income share, which historically represent well-defined social groups. Regarding the case studies selected for this dissertation, the main aim has been to examine countries diverse characteristics. Hence, the dataset included the liberal market economies of the USA and the UK, the sector coordinated market economies of Germany and France, and the nation coordinated, statist developmentalist economy of Sweden. It must be noted that data availability has been an important limitation due to the use of historical data, but the final set of case studies is representative of the three main types of western capitalist economies.

Therefore, this doctoral project examined three core research questions: (i) Have the business cycles of the USA and the UK been driven endogenously by private debt since the late 19th century, as suggested by Minsky's theory of endogenous debt-driven economic fluctuations? (ii) Have mortgage indebtedness, corporate indebtedness, real share prices, and stock market capitalisation contributed to declines in the income share of labour in France,

Sweden, and the USA since the late 19th century? (iii) Have household indebtedness, corporate indebtedness, real share prices, and stock market capitalisation induced the rise of the top one per cent income share of the USA, Germany, and Sweden in the neoliberal era?

As a first step of the analysis, the introductory chapter attempted to define what is financialisation. Despite some broad definitions of financialisation have appeared during the last few decades they do vary substantially. Implicitly or explicitly the vast majority of the financialisation literature discusses this phenomenon as a unique situation, i.e. as a new stage of capitalism or even as synonymous to neoliberalism. That becomes particularly evident in studies that build on the classical Marxist tradition (Lapavitsas, 2011) and describe financialisation as a distinct regime of accumulation of the post-Fordist era. This is somewhat inconsistent in the sense that early Marxist authors like Hilferding (1910) have discussed the financialisation of the economy in the context of the late 19th and early 20th centuries. Moreover, recent seminal works in the field of Quantitative Macroeconomic History (Schularick and Taylor, 2012; Jordá et al., 2013, 2015, 2016; Aikman et al., 2013) provide annual historical macroeconomic data on several financial variables since the mid-19th century contradict the view of financialisation as a new stage of capitalism. The historical financial series show that finance has been historically integral to the capitalist system of production of most advanced economies, rather than part of a particular phase of it. In addition, those studies also provide econometric evidence that financial variables, either private debt aggregates and/or asset prices, have been increasing the probability of financial crises and deeper recessions at least since the mid-19th century. Building on these datasets and findings, this doctoral research project calls for a different understanding of financialisation as a dynamic integral process which changes forms across space and time. The introductory chapter distinguished between three distinct financialisation processes: (a) the financialisation of the corporate sector due to riskier investment decisions *a la* Minsky; (b) the financialisation of the corporate sector due to the growth of the influence of stock markets on corporate governance; and (c) the financialisation of households through accumulation of private debt. The degree of deepening of each financialisation process can vary substantially under different regimes of accumulation and across countries. So far, the financialisation literature builds on the neoliberal experience mainly in the Anglophone advanced capitalist countries, describing financialisation as a combination of rising household indebtedness and shareholder value orientation. This doctoral research project rejects this rather myopic view of financialisation as biased from the experience of the last few decades. Considering finance as integral to capitalism, this project

aimed to improve our understanding of its macroeconomic effects in the long run. First, by testing Minsky's behavioural theory of endogenous debt-driven business cycles since the late 19th century, rather than conducting exploratory estimations as the rest empirical literature that uses historical macroeconomic data does. Second, by examining how different dimensions of financialisation have been influencing the distributional conflict between capital and labour since the late 19th century. Third, focusing on a more era-specific research question, I examined to what extent the neoliberal form of financialisation has contributed to the rise of the income share of rentiers and top managers, i.e. the top percentile income share. Perceiving financialisation as a combination of different processes in different sectors which can vary across countries, this study is one of the few studies financialisation that utilises time series econometric analysis and examines case studies other than the USA.

The first chapter aimed to explore if business cycles in the USA and the UK have been driven by corporate or mortgage debt since the late 19th century, testing Minsky's behavioural theory of endogenous debt-driven economic fluctuations (see Nikolaidi and Stockhammer, 2017). This theory suggests that firms increasing optimism during the boom makes them take riskier decisions, i.e. increase their debt ratios in order to invest more. As corporate debt accumulates, eventually debt service payments become unsustainable, thus firm have to decrease their investment expenditure, triggering a slowdown in accumulation. In this respect, there are two testable hypotheses that can be estimated to assess the existence of Minsky cycle: GDP or investment growth must exhibit a positive effect on corporate indebtedness, and corporate debt must have a negative effect on GDP or investment growth. Existing literature on debt-driven cycles examines them either in terms of standard deviation shocks of debt on growth, or the negative effects of private debt on growth (Palley, 1994; Kim, 2013, 2016), or test whether private indebtedness increases the probability of financial crises (Schularick and Taylor, 2012; Jordá et al., 2013, 2015, 2016; Aikman et al., 2013). Contrary to those approaches, this chapter focused explicitly on both aspects of Minsky's theory, i.e. debt-burdened growth and the procyclicality of the leverage ratio. The pair of estimating equations were strictly based on a simple predator-prey, difference equations system of private debt and growth which depicts a general Minsky debt model (see Nikolaidi and Stockhammer, 2017). Regarding the estimating methodology, I chose to allow the error terms to follow moving average error processes of order one (MA(1)), i.e. use the Autoregressive MA(1) model (ARMA(1, 1)). This choice has to do with the 2D predator-prey debt-growth system which is too minimalistic, thus technically misspecified from a statistics point of view, which would

have induced serial correlation in the residuals if ordinary least squares have been chosen instead of the ARMA(1,1) model. The full sample results provide strong evidence that the in the USA GDP and investment growth has been inducing higher business debt ratios since the late 19th century while rising debt ratios have been decreasing GDP and investment growth during the same period. The estimations which has been based both on an equation-by-equation basis and in a systems context (Vector Autoregressive MA(1) model) showed that the corporate leverage ratio has been procyclical, while simultaneously GDP growth and investment growth have been business debt-burdened, hence the USA has indeed experienced Minsky corporate debt-driven cycles at least during the last century. Regarding the UK, the corporate leverage ratio is found to be procyclical in the full period, but the effects of corporate indebtedness on growth are insignificant, hence Minsky's business cycle theory is not confirmed in this case. Also, the mortgage debt-growth system estimations do not provide evidence for mortgage-driven cycles either in the USA or the UK.

The second chapter shifted the focus from the analysis of business cycles to the scrutiny of the distributional conflict between capital and labour in historical perspective, i.e. it focused on the determinants of the labour share. Utilising recently developed historical databases on distribution indicators (Piketty and Zucman, 2014) and financial variables (Jorda et al., 2017), this chapter estimated the effects of three different channels of financialisation on the wage shares of France, Sweden, and the USA since the late 19th century. Despite the development of new databases with historical macroeconomic data has demonstrated that finance has been historically integral to capitalism, existing literature on the impact of finance on the functional income inequality has focused exclusively on the post-WWII period (e.g. Lin and Tomaskovic-Devey 2013; Alvarez, 2015; Stockhammer, 2017; Wood, 2017; Guschanski and Onaran, 2018; Köhler et al., 2018), which is rather myopic. The econometric estimations are based on the unrestricted error-correction model which has become a quite common approach in the social sciences distribution literature (e.g. Kristal, 2010; Volscho and Kelly, 2012; Bengtsson, 2014a; Godechot, 2016), as it effectively corrects for serial correlation and distinguishes between the long and the short-run effects, which can be analytically important. The econometric results for France show that the mortgage debt ratio and real share prices have been reducing its labour share since the early 20th century. In addition, government spending has a positive effect on its labour share in historical context, which provides support to the argument of Dutton (2002) that a universal social security system has been established in France as early as the pre-War under the pressure of progressive social movements. The econometric results for Sweden

suggest that mortgage debt, real share prices, and stock market capitalisation have been contributing to decreases in its labour share since 1891. There is also strong evidence that strong labour power resources have benefited labour in Sweden historically, as union density exhibits a positive effect which is statistically significant in most specifications estimated. The results on the effects of financialisation on the US labour share are mixed, as the coefficient of mortgage debt has a negative sign, but business debt is found to increase the labour share since 1929. Government spending exhibits a robust positive effect on the US labour share, showing that historically government intervention has benefited labour in the USA. Calculating the standardised coefficients for the baseline specification for the three countries, I find that: (a) the magnitude of traditional power resources variables, like government spending in France and the USA, and union density in Sweden, are stronger than the impact of finance indicators; and (b) in the USA the negative effect of mortgage debt is larger than the positive effect of business debt, therefore the total impact of financialisation is found to be negative. The econometric findings of this chapter provide support to the view that finance has been integral to capitalism at least since the late 19th century (see Jordá et al. 2017) by showing that financial variables do not only generate endogenous crises and deeper recessions (see Chapter 1; Jordá et al. 2013, 2015, 2016) but also disempower labour and induce higher income inequality. This finding is of particular importance, as recent studies on the nature of domestic demand regimes in historical context (Stockhammer et al. 2018) show that demand has been wage-led, i.e. reductions in the labour share have contractionary effects.

The third chapter shifted the focus from the historical dimension of financialisation and examined a research question that is of particular interest in the neoliberal era: Has the rise of the top percentile income share been induced by the neoliberal form of financialisation? Piketty (2014, pp. 276-278) argues that during neoliberalism, a substantial qualitative structural change has occurred to the top one per cent income share which has become the income share of capital owners and the top managerial class, i.e. the working super-rich. This is unlike the pre-WWII period in which the top one per cent used to depict the income share of rentiers. This remark implies that the study of the top percentile requires a time-specific study, i.e. focus on its evolution under certain regimes of accumulation where its demographics have not changed substantially. The present chapter contributes to the literature by examining the effects of financialisation on the top percentile income share of four different varieties of capitalism: USA (1974-2011), Germany (1972-2010), and Sweden (1981-2012). Existing literature on the impact of financialisation on the top percentile has been based mainly on panel data analysis

or focused exclusively on the case of the USA. I estimated the effects of various channels of financialisation, including proxies such as household debt, business debt, real share prices, and stock market capitalisation and control variables like union density, government spending, trade globalisation, and corporate taxation. The estimations were based on the unrestricted error-correction model, similar to the labour share estimations of chapter two. For the USA, the econometric results suggest that real share prices have increased its top one per cent, while unionisation exhibits a negative sign, with the magnitude of the former being larger. In Germany, trade globalisation has a positive impact which prevails over the rest statistically significant effects, which is consistent with its classification as export-oriented (Stockhammer et al. 2016). The long-run coefficients of union density and government spending do have the expected negative signs, while real share prices decrease its top percentile share. In Sweden, corporate debt and real share prices are found to induce increases in the top percentile, whereas household debt has a negative effect on the top one per cent. The latter finding provides support to Argitis and Dafermos (2013) who argue higher household indebtedness in countries with strong labour power resources can lead to less inequality. The econometric results of this chapter show that the drivers of the rise of the top one per cent vary significantly in different varieties of capitalism. Overall, in contrast to functional income distribution, the magnitudes of the financialisation variables are found to be larger than those of labour power resources.

Summarising, the present doctoral project contributed to the empirical literature on the macroeconomic effects of financialisation by providing strong evidence that: (1) corporate debt has been creating endogenous financial instability in the US economy during the last century; (2) private indebtedness and the growth of the influence of stock markets have been decreasing the labour shares of France, Sweden and the USA at least since the late-19th century; and (3) the rise of the top percentile income share in the neoliberal era is a phenomenon linked to the growth of financial activities in most countries. There are few possible straightforward extensions to this research agenda: First, to develop fully specified models that include the destabilising roles of private indebtedness and asset prices together, and examine them empirically. Second, further development of historical macroeconomic databases, which will include more countries (e.g. developing economies) and more sophisticated finance indicators (e.g. dividend payments and financial globalisation indices), will allow to expand the analysis on whether financialisation has been historically integral to capitalism across a wider variety of economies and use better proxies for specific theoretical arguments. Third, the phenomenon of endogenous business cycles, like income distribution, can depend on various factors beyond

the impact of finance, hence future studies should use the 2D predator-prey framework of chapter one to examine other types of endogenous cycles, e.g. growth-profit share Goodwin (1967) cycles or growth-government spending political business cycles (Kalecki, 1943).

Focusing on specific aspects of the macroeconomic impact of financialisation, the first two chapters demonstrated that finance has been historically integral to capitalism, while chapter three argued that certain dimensions of the macroeconomy require an analysis that takes into account specific historical accumulation regimes and their characteristics. Thus, arises the question: How should the financialisation literature move forward? The short answer to this question is that a general theory of financialisation must be developed. This requires an empirical analysis that examines financialisation as integral to capitalism, but with a focus on how financialisation has changed under different epochs, i.e. under different regimes of accumulation. The French Regulation Theory (Boyer, 1990) and the Marxist Social Structures of Accumulation approach (Gordon et al., 1982) emerged during the late Fordist period as attempts to explain the 1970s stagflation crisis and examine how different institutional complementarities, i.e. modes of regulation, supported growth in different historical periods. However, both approaches largely overlook the role of finance. Hence, future research should build on those approaches and examine different financial variables as indicators of different dimensions of financialisation in order to answer to what extent finance has been dominant historically and how financial structures have changed under different modes of regulation. Such an analysis requires a long-term perspective, thus the use of historical macroeconomic data. Expanding the analysis of the introductory chapter of this thesis, future studies on financialisation should distinguish between two main types of financialisation: household-driven and corporate-driven. Further, it would be beneficial to identify additional sub-varieties, such as bank-based household-driven, housing asset-driven, rentier-dominated, and corporatist financialisation periods. Initially, the study may focus on the two main categories by examining graphically if the GDP share of mortgage debt exceeds the GDP share of the corporate debt. If that is the case then this period will be characterised as a household-driven financialisation regime; if not, it will be described as corporate-driven financialisation. Focusing on the household-driven financialisation periods econometric causality tests can unveil whether there is bidirectional positive causality between mortgage debt and house prices, i.e. a housing bubble. If this relationship exists, then the regime shall be characterised as housing asset-driven financialisation. By the same token, if in a corporate financialisation period the increase in corporate debt induces higher share prices, then this period will be described as rentier-

dominated financialisation regime since this will indicate that leverage was used to maximise shareholder value (Lazonick and O'Sullivan, 2000). Needless to say, it is of great importance to examine this phenomenon on an individual country basis, since significant cross-country discrepancies do exist, therefore a domestic financialisation regime may vary significantly across time and space.

More broadly, regarding the future research agenda of political economy, it is of great importance expanding the connections between global political economy and the heterodox economics traditions which can be mutually beneficial. International political economists should shift their focus from the narrow micro-level analysis and embrace the macroeconomic analysis of the Post-Keynesian tradition which offers a framework that links class struggle and macroeconomic stability building on the notions of wage- and profit-led demand (e.g. see Stockhammer et al., 2016). Such a framework allows to go beyond the concept of social equality *per se*, and discuss its relationship with economic stability, which eventually helps us assert whether social democratic policies can stabilise the system. Moreover, more extensive use of econometric methods -as this study did- would allow scrutinising various unexplored political economy arguments, as descriptive statistics (which are more commonly used in international political economy) cannot effectively unveil the causality among different variables. In turn, contemporary Post-Keynesians have a lot to learn from global political economy and politics, as their analysis has become more economistic in the narrow sense, moving away from its political economy roots. In recent decades, Post-Keynesians have focused to a large extent on building formal macroeconomic models and using formal statistical techniques to examine existing political economy arguments, rather than provide their own political economy explanation of current issues. At the same time, most of their criticism against mainstream economics is focused on the absence of political economy, which is somewhat contradictory. One of the most notable shortcomings of the contemporary Post-Keynesian tradition is the absence of a coherent state theory and the absence of the role of politics. A possible path to overcome this shortcoming is to go back to its roots and more specifically to Kalecki (1943) who has stressed the twofold role of state intervention for macroeconomic stability and ruling class' political uncertainty which can create endogenous instability. This will allow, for instance, not only to analyse the economic effects of financialisation and market deregulation but also to understand how the balance of power among different social classes affects the policy decisions of governments on (de)regulation (Gouzoulis and Constantine, 2019). In addition, few recent studies (Palley, 2015; Gouzoulis,

2019) argue for the importance of the political economy of the middle working class, as this social group may share interests simultaneously with the lower working class and the capital owners. This element introduces an opportunistic aspect into its behaviour, which could explain why empirical survey studies report that the middle class often acts as a political advocate of pro-capital reforms, such as financial liberalisation and trade globalisation (Loayza et al. 2012; Lupu and Pontusson, 2011). In this sense, a necessary development in order to produce policy-relevant alternatives to neoliberalism is to go beyond the classical workers-capitalists class dichotomy and take into account the political and macroeconomic role of the middle working class.

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